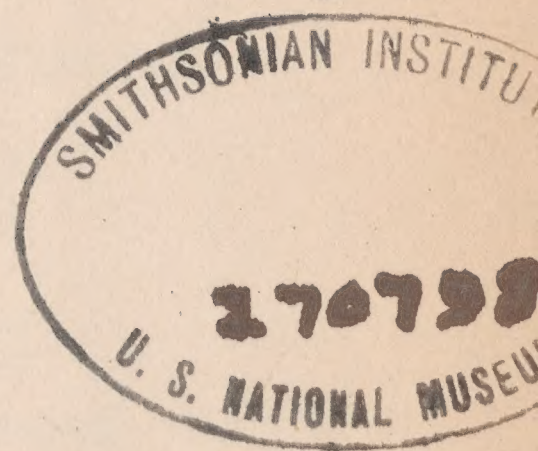
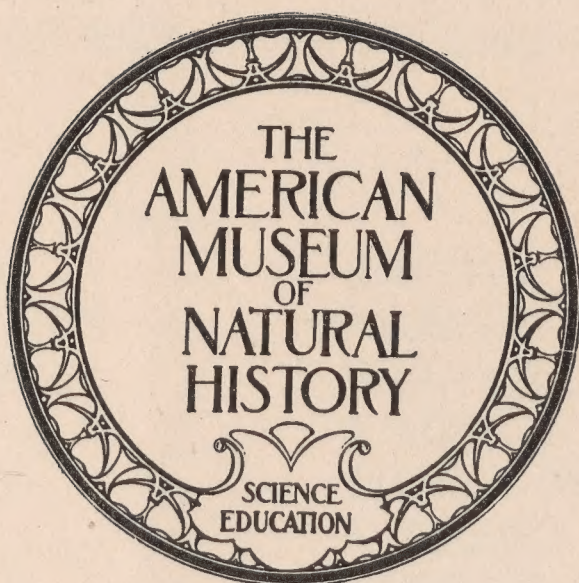






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VOLUME LII, 1925



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REFERS

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ERRATA

Page 15, line 17 from top, for *Bothracara* read *Bothrocara*.

“ 46, line 9 from bottom, for *fiffh* read *fifth*.

“ 79, line 5 from top, for *gelastes* read *genëi*.

“ 81, line 17 from top, for *franklini* read *pipixcan*.

“ 81, line 17 from top, for *gelastes* read *genëi*.

“ 87, line 11 from top, for *forbeeni* read *frobeeni*.

“ 88, line 24 from top, for *kittlizzii* read *kittlitzii*.

“ 90, line 3 from top, for *Larus* read *Hydrocolæus*.

“ 90, line 19 from bottom, for *Larus* read *Hydrocolæus*.

“ 106, line 9 from top, for *fuscus* read *furcatus*.

“ 111, line 2 from top, for *Chroicocephalus* read *Hydrocolæus*.

“ 185, line 19 from bottom, for *dominicanis* read *dominicanus*.

“ 261, line 2 from bottom, for *gelastes* read *pipixcan*.

“ 270, line 17 from bottom, for *cirrhocephalis* read *cirrhocephalus*.

“ 292, line 8 from bottom, for *franklini* read *pipixcan*.

“ 304, line 1 from top, for *Chroicocephalus* read *Hydrocolæus*.

“ 322, line 17 from bottom, for *stands* read *stand*.

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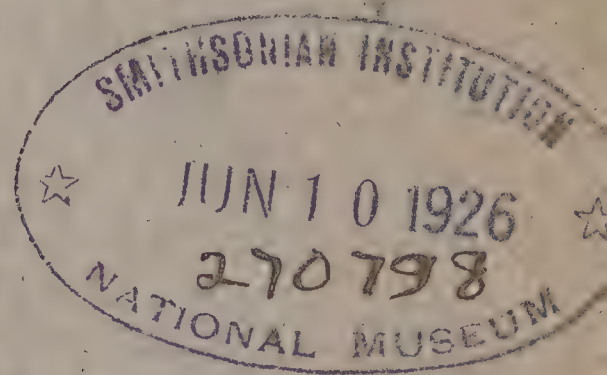
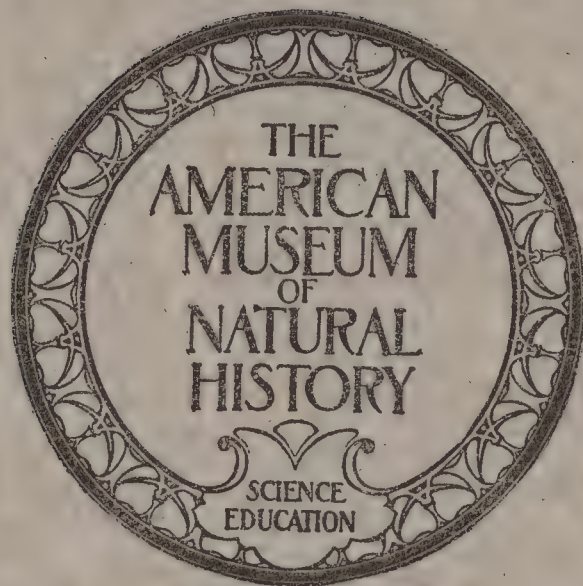
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Article I.—DEEP SEA FISHES OF THE 'ALBATROSS' LOWER
CALIFORNIA EXPEDITION¹

PLATES I TO IV AND 1 MAP

BY CHARLES H. TOWNSEND AND JOHN T. NICHOLS

The deep-sea fishes obtained by the 'Albatross' Expedition of 1911 to the Gulf of California were dredged at twenty-six stations between Cape San Lucas, Lower California, and Monterey, California, all but four being within the 1000-fathom line of depth.

The region covered by the dredgings, a thousand miles or more in length, is, in general, rich in those forms of life characteristic of the "deep-sea" fauna. Both fishes and invertebrates, including those taken near shore at a depth no greater than 284 fathoms, were often found in abundance.

The collection of fishes, numbering several hundred specimens, contains forty-nine species, of which only five are here described as new. This small proportion of new forms may be explained by the fact that the deep-sea fishes of this region are already well known from dredgings made by the 'Albatross' during many years of fishery service along the Pacific Coast.

The large number of species discovered since 1888 indicates that the continental slope here has a fish fauna largely its own. While there is some mingling with the many forms now known from Alaskan depths, there is comparatively little identity with those taken southward from the Gulf of California and still less with the deep-water fishes of the Hawaiian region.

¹Scientific Results of the Expedition to the Gulf of California in charge of C. H. Townsend, by the U. S. Fisheries Steamship 'Albatross,' in 1911. Commander G. H. Burrage, U. S. N., Commanding. XIV. Published by permission of the U. S. Commissioner of Fisheries.

Only a few fishes were taken in the four hauls deeper than 1000 fathoms, although invertebrates were well represented in number and species. The fishes are *Raja microtrachys*, *Bathysaurus mollis*, *Narcetes stomias*, *Cyclothone acclinidens*, *Plectromus maxillaris*, *Lycodapus fierasfer*, *Macrourus acrolepis*, and *Macrourus albatrossus*. Single representatives of Atlantic and Antarctic genera, *Cyema*, *Bathysaurus*, and *Harriotta*, are new to eastern Pacific waters, the last being different from the Atlantic form.

Deep-sea fishes were sometimes taken in considerable numbers; at station 5675 in 284 fathoms the dredge brought up fifty-nine *Macrourus*, eighteen *Catulus*, and one *Nemichthys*.

From station 5682 in 491 fathoms, there are forty-four fishes representing *Macrourus*, *Merluccius*, *Alepocephalus*, and *Argyropelecus*.

Station 5693, in 457 fathoms, yielded thirty fishes of four genera. Station 5696, in 440 fathoms, yielded nine species of fishes.

At most stations where fishes were taken there was a much greater weight and variety of invertebrates, good hauls of fishes, in fact, usually depending on the abundance and variety of invertebrate life as represented by crustaceans, mollusks and annelids. Fishes were at times, however, dredged with quantities of invertebrates showing nothing more palatable than starfishes, sea urchins, and crinoids.

It is probable that the deep-sea fishes already known to science represent but a moderate proportion of those that move aside from the path of the dredge, and that the discovery of other and larger forms awaits the use of some larger apparatus.

It is of interest to note that at station 5674, in 590 fathoms, three fishes, *Plectromus*, *Cyclothone* and *Serrivomer* came up alive, a most unusual occurrence in the case of fishes from such a depth. The difference between bottom and surface temperature at this station was recorded as nineteen degrees. There is a difference of more than half a ton to the square inch in sea pressure between the bottom at 590 fathoms and the surface, while the difference in the amount of light would be equal to that between night and day. Such are the barriers between the deep-sea and the shore faunæ, even at this moderate depth.

The records of bottom temperature kept during the voyage show that, at depths greater than 500 fathoms, bottom temperatures ranged from 37 to 39 degrees. In depths between 300 and 500 fathoms, bottom temperatures were from 40 to 44 degrees.

The greatest difference between bottom and surface temperatures was found off Cape San Lucas, where at a depth of 630 fathoms the

bottom temperature was 39 degrees, while at the surface it was 73 degrees. Bottom temperatures of 36 degrees were obtained by the Albatross in the lower part of the Gulf at depths of 1200 to 1500 fathoms.

About ten miles off Cape San Lucas the 1000-fathom line turns away from the coast until in Lat. $23^{\circ} 20'$ N. it is sixty miles off-shore. At Magdalena Bay it lies about half that distance away. A hundred miles farther north it is 65 miles off, again approaching the coast within 25 miles off San Hipolito Bay. From this point northward to the San Benito Islands there are depths of 1000 fathoms within sight of land.

North of the San Benitas the line lies farther off, trending nearer the coast at San Quentin. In the latitude of the United States and Mexican boundary the 1000-fathom line is more than 100 miles from the coast, passing from 20 to 40 miles outside of the islands of southern California. From Point Conception northward to near Monterey it lies at distances varying from 30 to 50 miles.

Four hauls were made in depths exceeding 1000 fathoms, the deepest being about 100 miles northwestward of Cape San Lucas in 1760 fathoms (two miles exactly), where the only fish taken was *Bathysaurus mollis*. The last dredge haul of the season was made about 35 miles south of Monterey in 659 fathoms.

The 2000-fathom line of depth, still imperfectly known, is not far beyond the 1000-fathom line, its distance from it apparently averaging less than the distance of the latter from the coast.

While the 1000-fathom curve extends into the Gulf of California as far as 180 miles north of Cape San Lucas, deep-water dredging was not attempted there, the results obtained during two former voyages having yielded little of interest.

During the voyage plaster casts of thirty-one deep-sea fishes in perfect condition were made by Mr. J. C. Bell, modeler of the Museum staff. Some of these yielded more exact measurements than the alcoholic specimens from which they were made when fresh. Photographs of the most interesting are reproduced herewith. The casts are of decided value as museum exhibits of deep-sea types, otherwise difficult to display in attractive form.—C. H. T.

DREDGING STATIONS

U. S. S. 'ALBATROSS' LOWER CALIFORNIA CRUISE, 1911

DREDGING STATIONS	LAT. AND LONG.		DATE	FATHOMS	BOTTOM TEMP.
5673	31° 26' 00'' N.	117° 42' 00'' W.	Mar. 1	1090	
5674	31° 28' 45'' N.	117° 09' 50'' W.	Mar. 8	590	39.4
5675	27° 07' 08'' N.	114° 33' 10'' W.	Mar. 15	284	44.6
5676	25° 31' 15'' N.	113° 29' 30'' W.	Mar. 17	645	39.0
5677	25° 23' 45'' N.	113° 16' 00'' W.	Mar. 17	735	38.6
5678	24° 35' 20'' N.	111° 59' 35'' W.	Mar. 21	13½	
5679	23° 47' 45'' N.	111° 23' 00'' W.	Mar. 22	325	44.1
5680	23° 40' 30'' N.	111° 12' 45'' W.	Mar. 22	389	43.6
5681	23° 33' 15'' N.	111° 02' 10'' W.	Mar. 22	405	43.3
5682	22° 48' 20'' N.	109° 52' 40'' W.	Mar. 24	491	40.8
5683	22° 46' 45'' N.	109° 50' 15'' W.	Apr. 20	630	39.1
5684	23° 23' 30'' N.	112° 00' 30'' W.	Apr. 21	1760	
5685	25° 42' 45'' N.	113° 38' 30'' W.	Apr. 22	645	
5686	26° 14' 00'' N.	114° 00' 00'' W.	Apr. 22	930	37.3
5687	27° 39' 15'' N.	115° 16' 00'' W.	Apr. 23	480	41.1
5688	27° 38' 45'' N.	115° 17' 40'' W.	Apr. 23	525	39.9
5689	29° 23' 00'' N.	116° 14' 00'' W.	Apr. 24	879	
5690	29° 29' 00'' N.	116° 18' 00'' W.	Apr. 24	1101	38.1
5691	31° 08' 20'' N.	118° 29' 30'' W.	Apr. 25	868	37.2
5692	31° 23' 45'' N.	118° 31' 30'' W.	Apr. 25	1076	37.1
5693	33° 13' 30'' N.	120° 04' 30'' W.	Apr. 26	451	
5694	33° 24' 36'' N.	120° 12' 30'' W.	Apr. 26	640	
5695	33° 33' 00'' N.	120° 17' 30'' W.	Apr. 26	534	38.9
5696	35° 18' 30'' N.	121° 28' 00'' W.	Apr. 27	440	39.9
5697	35° 35' 00'' N.	121° 39' 00'' W.	Apr. 27	485	39.8
5698	35° 50' 00'' N.	121° 49' 30'' W.	Apr. 27	475	39.9
5699	36° 00' 30'' N.	122° 00' 00'' W.	Apr. 27	659	37.9

Polistotrema curtiss-jamesi, new species

The common hagfish, *Polistotrema stouti*, is frequently recorded from depths down to several hundred fathoms, but perhaps specimens from the depths have not been carefully compared with those from shallow water. We have hagfish dredged from south of Monterey, California, to west of the Santa Barbara Islands, approximate latitudes 36° to 34°, depths of from 440 to 585 fathoms, as follows: one from station 5697 in 585 fathoms, one from station 5695 in 534 fathoms, three from station 5696 in 440 fathoms, and one from station 5698 in 475 fathoms, and these show constant differences which we here recognize as specific from *P. stouti*. They differ from it in two or three obvious proportional measurements as follows:

Head to first branchial aperture contained between 5 and 6, versus $4\frac{1}{2}$, times in total length; branchial region between 6 and 7, versus 8. Anal fin and abdominal keel uniform in color, lacking the pale edge. Branchial apertures 10 to 11. All are full-grown specimens—that from Sta. 5695, 15 inches total length; the stations are from Santa Barbara Islands to near Monterey.

The type, No. 8341, American Museum of Natural History, collected by the 'Albatross' Lower California Expedition of 1911 off Central California, between Monterey Bay and Pt. Conception, Sta. 5697, 585 fath., April 27, 1911, is $15\frac{1}{2}$ inches in total length. Snout, 18 times in total length; head to first branchial aperture, 6; branchial region, 6; tail, $6\frac{3}{5}$. Depth at beginning of abdominal keel, $2\frac{1}{3}$ in head. Dorsal and anal confluent with caudal, which is rounded, depth of this compound fin, 2 in head. Dorsal extending as a low keel to before vent; abdominal keel to a distance back of last branchial aperture equalling depth of body at that point. Branchial apertures 11. Uniform dark plum color, including fins, the barbels paler.

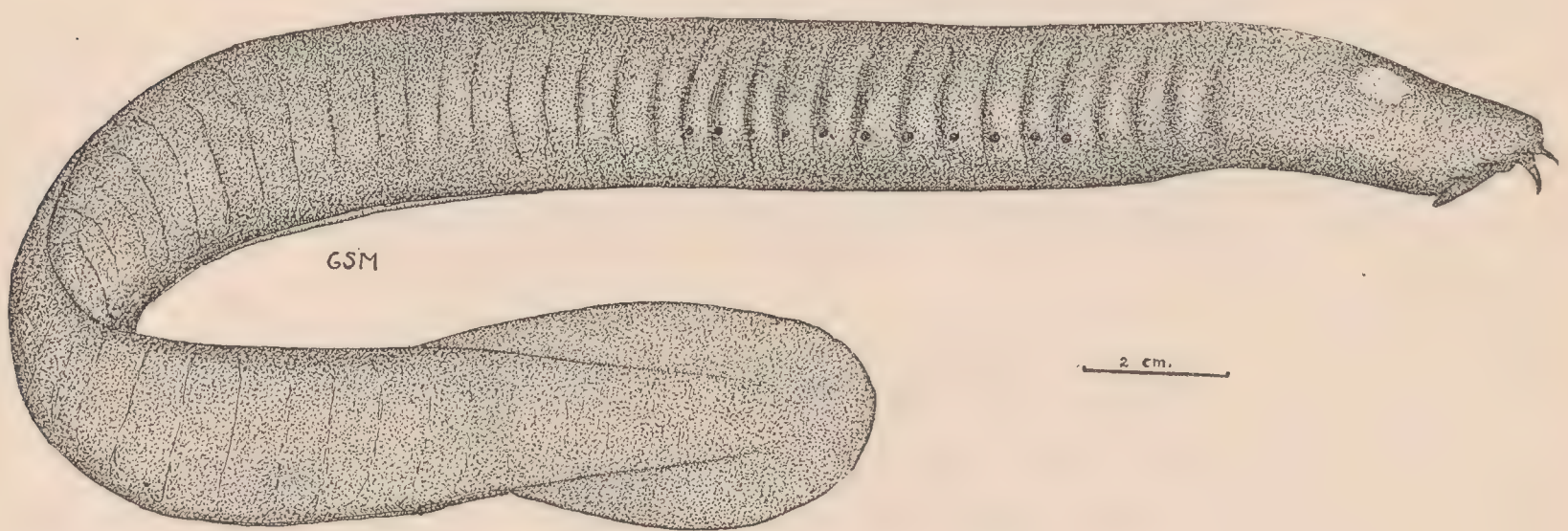


Fig. 1. *Polistotrema curtiss-jamesi*. Type.

Directly compared with a specimen of *P. stouti* (No. 2702 American Museum of Natural History) of the same length taken in Monterey Bay by E. C. Starks. All our six specimens (as well as the specimen of *P. stouti* with which they have been compared) have only the last branchial aperture of the left side conspicuously enlarged.

Named for Mr. Arthur Curtiss James, of New York.

***Catulus xaniurus* Gilbert**

A number of specimens (18) from station 5675, approximate latitude 27° , in 284 fathoms, off the middle of the west coast of Lower California. The largest of these measures 18 inches.

***Catulus brunneus* Gilbert**

One small specimen from station 5696 (north of Pt. Conception, California) in 440 fathoms, approximate latitude 35° .

Catulus cephalus Gilbert

One specimen from station 5680 in 389 fathoms and several from station 5681 in 405 fathoms; approximate latitude 24° , north of Cape San Lucas on the west coast of Lower California.

Raja trachura Gilbert

A male specimen 28 inches long, from station 5694 (southwest of Santa Barbara Islands, California, approximate latitude 33°), in 640 fathoms.

This differs from the type of *R. trachura*, apparently the only specimen of that fish previously described, 18 inches long and probably a female (though we find no definite statement to that effect), in several particulars which can be referred to age and sex.

Eye smaller, $1\frac{2}{3}$ in interorbital, 4 in snout. No tubercle in center of back between shoulders. A conspicuous patch of erectile hooks on the pectoral, consisting of 22 rows, with five spines in the longest of these. No median dorsal spines forward of pectoral angle. Color, fresh, plumbeous.

Raja microtrachys Osburn and Nichols

The type of *R. microtrachys* is from station 5673 (southwest of San Diego, California, approximate latitude 31°) in 1090 fathoms, and is so tagged. Osburn and Nichols erroneously attributed it to Guadaloupe Island, the nearest shore station where collecting was done by the 'Albatross' at this time, due to its having in some way become confused with the shore material.

So few specimens of deep-water skates allied to this and the preceding have been collected that it is impossible to state with certainty how many species should be recognized. Color, fresh, dark grayish brown.

Harriotta curtiss-jamesi, new species

A single specimen of *Harriotta* six inches in total length and the first fish of this genus to be recorded in the eastern Pacific is very similar to *Harriotta raleighiana*, from the Atlantic, as described by Goode and Bean in 'Oceanic Ichthyology.' Its eye is notably larger and the species apparently a smaller fish than its Atlantic representative. This specimen (No. 8342, American Museum of Natural History) is from station 5685, 645 fathoms, about 26° N. lat., off Lower California.

Four specimens of *H. raleighiana* are described; three of these similar, supposed to represent the adult form (of which the largest was

25 inches, the smallest about one foot in length) and it is these that our specimen closely resembles. The fourth specimen of *raleighiana*, a young one four inches long, was quite dissimilar. It might be argued that our young fish was of minimum size for the adult form of this previously described species and that the eye would become relatively smaller with growth. However, the four-inch Atlantic fish just referred to had a small eye and, if we are to accept it as the young of the same species represented by larger Atlantic specimens, this little Pacific specimen is not the same. It might reasonably be supposed that, if allied, it would be recognizably different.

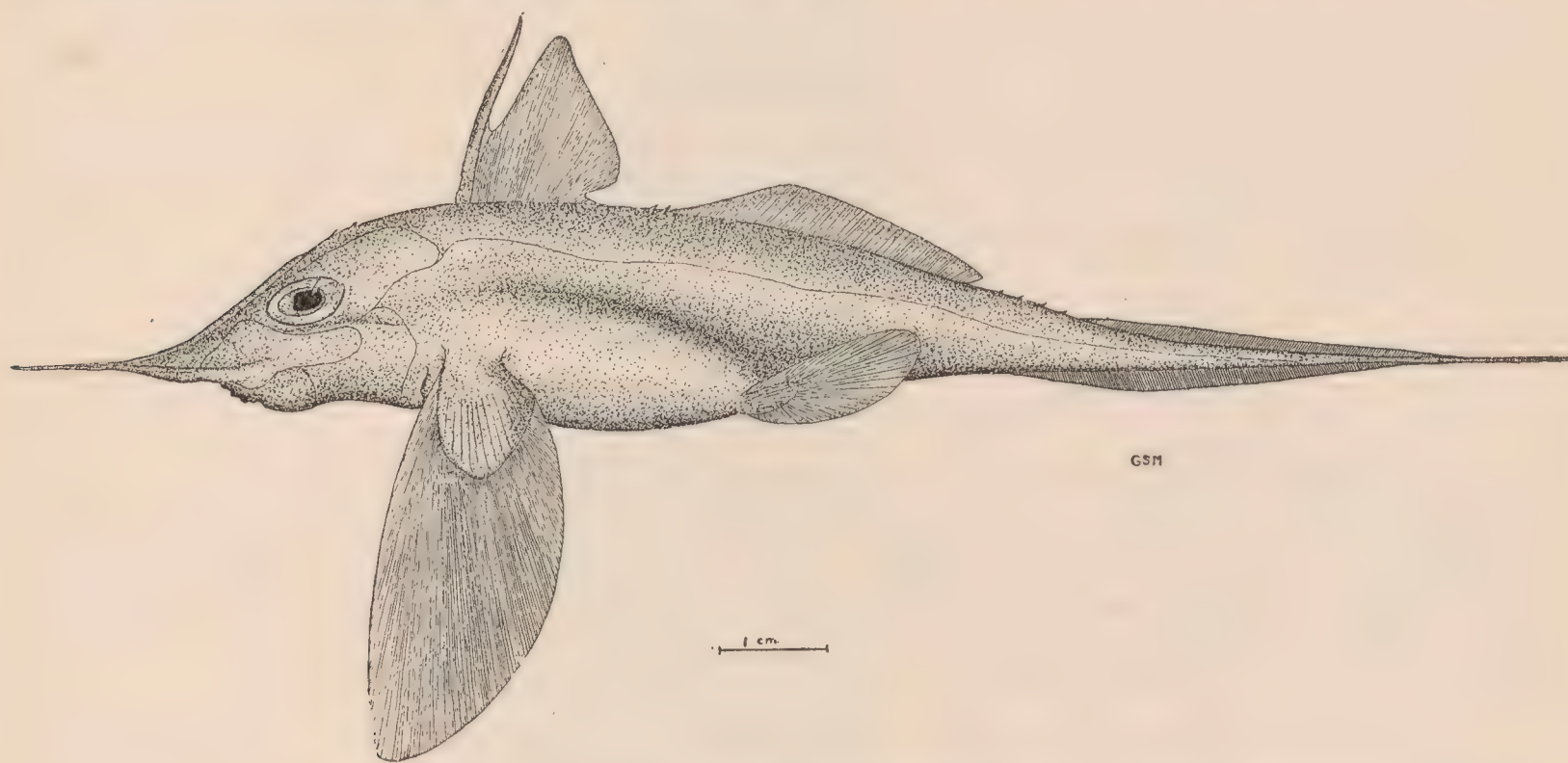


Fig. 2. *Harriotta curtiss-jamesi*. Type.

We find it shows the following discrepancies with the description of *Harriotta raleighiana*.

The interval between the two dorsal fins is two-thirds the diameter of the eye instead of nearly the diameter of the eye; the height of the second dorsal is two-thirds of the diameter of the eye instead of equaling the diameter of the eye; the length of the second dorsal is contained one and a half times in the head, instead of equaling the head; the ventrals extend to a point just short of the end of the second dorsal, instead of only to a point two-thirds of the distance between its origin and end; they measure a little more than two-thirds of the snout instead of a little less than half the snout; the eye is contained a scant three times in the snout instead of five and a half times in the larger specimens, four and a half times in the one of about a foot length, and in the young one of about four inches the eye is appreciably larger than the inter-orbital.

Otherwise this fish agrees closely with the figures and description of *Harriotta raleighiana*, having the same filamentous tail, long leaflike snout, arrangement of lateral lines, spines on the head and back, proportions and relative position of fins, shape of body, etc. It is black in color.

Named for Mr. Arthur Curtiss James through whose munificence the Museum was enabled to participate in the Lower California Expedition.

***Alepocephalus tenebrosus*, Gilbert**

Plate II, Figure 1

Specimens from stations 5682, 5685, 5688 in 491 to 645 fathoms, and two others too imperfect to be determinable with certainty from stations 5683 and 5694 in 630 to 640 fathoms. The above stations range from approximate latitudes 28° off Pt. San Bartholome to 23° off Cape San Lucas, Lower California, with the exception of the last named which is farther north, approximate latitude 33° , southwest of the Santa Barbara Islands, California.

Color, fresh, entirely black (station 5682). Five specimens, station 5688, pebbly bottom, head deep blue-black, body lighter.

Alepocephalidæ

BAJACALIFORNIA, new genus

Body covered with small thin cycloid scales. Ventrals well developed. Mouth moderately wide, larger than in *Alepocephalus*. Lower jaw strongly projecting, ending in a pointed knob directed obliquely forward. Edge of jaws with a single row of small teeth. Gill openings wide, membranes joined below, free from isthmus. Dorsal and anal short, of about equal length, anal origin behind middle of dorsal.

Named for the peninsula of Lower California. Based on the following new species.

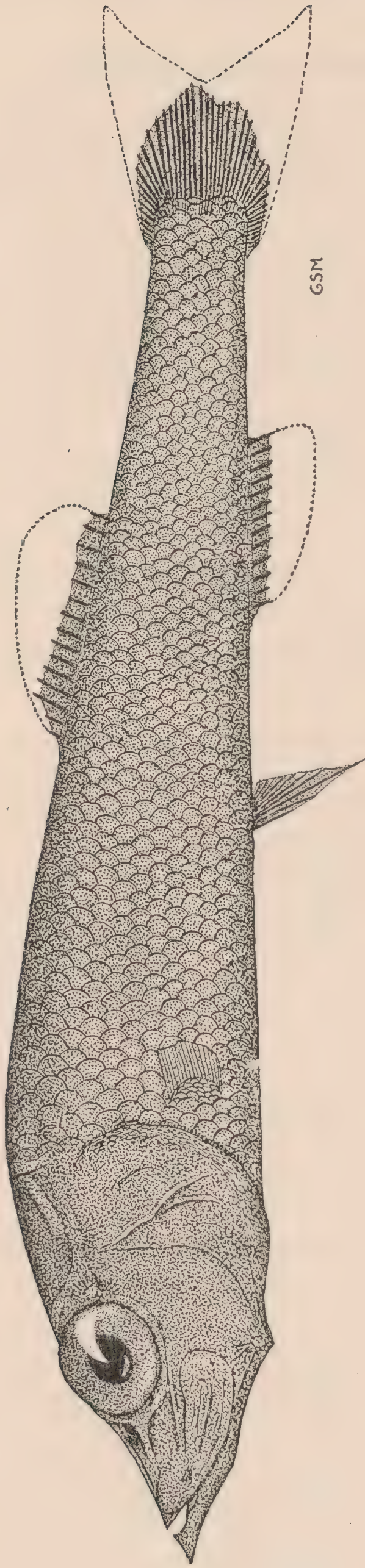
***Bajacalifornia burragei*, new species**

The type and only specimen (No. 8343, American Museum of Natural History) collected by the 'Albatross' Expedition of 1911 off Todos Santos Bay, Lower California, station 5674, approximate latitude 31° , 590 fathoms, is $4\frac{3}{4}$ inches long to base of caudal (which is broken). Head, $3\frac{1}{2}$ in length to base of caudal; depth $5\frac{1}{2}$. Eye, $3\frac{1}{2}$ in head; maxillary, $2\frac{1}{4}$; snout, 3; interorbital space, $\frac{1}{2}$ eye.

Mandible projecting a distance equal diameter of pupil. Origin of dorsal equidistant from base of caudal and margin of preopercle. Base of ventral equidistant from base of caudal and center of eye. Origin of anal slightly behind center of dorsal. Greatest depth at back of head. Eye impinging on upper outline of head. A distinct ridge over each eye. Interorbital narrowly concave. Snout rather broad and rounded in cross section, concave in profile. Maxillary wide, barely reaching center of eye. Mandible with a pointed knob at symphysis directed forward and downward. Width of snout $\frac{2}{3}$ diameter of eye. Width of posterior end of maxillary $\frac{3}{5}$ eye. Color uniform black.

Dorsal, 16; anal, 13; pectoral, 17; ventral, 10.

Named for Commander G. H. Burrage, U. S. N., commanding the 'Albatross' in 1911.



1 cm.

Fig. 3. *Bajacalifornia burragei*. Type.

Narcetes stomias (Gilbert)

One specimen fifteen inches long from station 5692, approximate latitude 31° , 1076 fathoms, southwest of San Diego, California, unquestionably represents Gilbert's *stomias*, but seems to belong in *Narcetes* rather than *Bathytroctes*. Garman's *Narcetes pleuriserialis* is not very different and may be the same.

Color, fresh, body and caudal dusky black, head blue-black.

Bathysaurus mollis Günther

Plate I, Figure 1

One from station 5684, in 1760 fathoms. The only fish from this station, which is off the west coast of southern Lower California, approximate latitude 23° . It is $17\frac{1}{4}$ inches long to base of caudal.

Although we can find no character to separate our fish from *mollis*, we give herewith a detailed description of this interesting specimen.

Head, $4\frac{1}{2}$ in length to base of caudal; depth, $7\frac{4}{5}$; eye, $7\frac{1}{2}$ in head. Dorsal with 15 rays; anal 12; ventral 8. Scales (estimated) 100. Width of head $\frac{1}{2}$ its length; gape $6\frac{1}{2}$ in total length of fish. Teeth slightly barbed.

Gape extending behind eye for a distance much greater than interorbital width; equaling distance from center of eye to snout. Dorsal inserted $1\frac{2}{3}$ times the length of its base behind snout. Length of fourth dorsal ray slightly greater than that of maxillary. Mandible projecting beyond snout a distance equal to width of pupil. Maxillary $1\frac{1}{2}$ in head. Interorbital width $5\frac{1}{2}$ in head. Seven to 8 large oval pores on mandible, elongated except the two anterior ones. Head naked, except cheeks and nape. Adipose dorsal present, half-way between origin of ventral and base of caudal. Anal inserted behind dorsal a distance equal to the length of its own base. Anal base $1\frac{1}{3}$ in dorsal base. Ventral, pectoral and dorsal rays equal in length, $\frac{5}{6}$ of head. Color white, lining of gill cavity black.

Myctophum californiense Eigenmann and Eigenmann

A specimen from station 5695 (southwest of the Santa Barbara Islands, approximate latitude 34°) in 534 fathoms.

Nannobrachium leucopsarum (Eigenmann and Eigenmann)

A specimen from station 5693, southwest of the Santa Barbara Islands, California, in 451 fathoms; one from station 5694 in 640 fathoms; and a third (imperfect) from station 5697 between Monterey and Pt. Conception, California, in 485 fathoms, latitudes 36° to 33° .

Nannobrachium regale (Gilbert)

One large and one small specimen from station 5693, southwest of the Santa Barbara Islands, California, in 451 fathoms, and a small one from station 5695 in 534 fathoms, approximate latitudes 33° to 34° .

Scopelengys dispar Garman

One each from station 5687, off Pt. San Bartholome, Lower California, in 480 fathoms, and station 5677, somewhat farther south, in 735 fathoms, approximate latitudes 28° to 25° .

Cyclothone acclinidens Garman

One each from station 5693, 451 fathoms, and station 5692, 1076 fathoms; two from station 5687, 480 fathoms; southwest of the Santa Barbara Islands, California, to off Pt. San Bartholome, Lower California, approximate latitudes 33° to 28° . These fragile specimens are apparently *acclinidens* of Garman, which possibly may be what earlier authors have identified as Pacific *microdon*.

Chauliodus sloanei Bloch and Schneider

One from station 5697 (south of Monterey, California, approximate latitude 36°), in 485 fathoms, not in good condition.

Argyrolepecus lichnus Garman

One taken at station 5682, in 491 fathoms.

Argyrolepecus affinis Garman

A specimen from station 5691, in 868 fathoms (off Todos Santos Bay, Lower California, approximate latitude 31°), and another from station 5686, in 930 fathoms (off Balenas Bay, approximate latitude 26°).

Halosaurus attenuatus Garman

One from station 5676 (approximate latitude 26° , off Pt. San Juanico, Lower California), 645 fathoms. Identification somewhat uncertain owing to mutilation of specimen.

Venefica tentaculata Garman

Four specimens of this genus we refer to this single variable species. All approximate Garman's description thereof, and differ from *V. ocella* chiefly in having a decidedly shorter tentacle on snout. All are from near the same locality, approximate latitudes 25° to 26° , off Pt. San Juanico, Lower California, 647 to 735 fathoms.

One from station 5677, in 735 fathoms, 28 inches long, has well-developed caudal, equaling $\frac{4}{5}$ snout. One from station 5676, 647 fathoms, 30 inches long has less developed caudal equaling $\frac{3}{5}$ snout.

Another from the same station, 29 inches long, has whip-like caudal region and very narrow caudal equaling $\frac{2}{5}$ snout. One from station 5685, in 645 fathoms, 23½ inches long, has wide and heavy caudal and much the broadest caudal region, caudal $1\frac{1}{5}$ times snout.

Serrivomer sector Garman

A specimen nineteen inches long from station 5674, approximate latitude 31°, off Todos Santos Bay, 590 fathoms, and a second somewhat imperfect one from station 5683, off Cape San Lucas, approximate latitude 23°, 630 fathoms, are obviously this species of Garman, which, as Gilbert suggests ('Deep Sea Fishes of the Hawaiian Islands,' p. 586), may be identical with *S. beani* of the Atlantic.

Nemichthys fronto Garman

One from station 5685 southwest of Balenas Bay, approximate latitude 26° in 284 fathoms, and one from station 5687 off Pt. San Bartholome, approximate latitude 28°, in 480 fathoms.

Cyema atrum Günther

One specimen from station 5691, 868 fathoms (approximate latitude 31°, off Todos Santos Bay, Lower California).

Color, fresh, entirely black.

This is the first record of the occurrence of this genus in eastern Pacific waters.

Plectromus [**Melamphæs**] **maxillaris** Garman

A specimen from station 5695 (near the Santa Barbara Islands, California, approximate latitude 34°) in 534 fathoms, and one from station 5692 (west of San Diego, California, approximate latitude 31°) in 1076 fathoms. A third specimen of this genus from station 5675 is too mutilated for specific determination.

Color, fresh, black (station 5692).

Plectromus [**Melamphæs**] **cristiceps** Gilbert

Plate II, Figure 2

Specimens from station 5674, off Todos Santos Bay, Lower California in 590 fathoms; station 5687, off Pt. St. Bartholome in 480 fathoms; station 5691, off Todos Santos Bay, in 868 fathoms; and one of 5¼ inches length to base of caudal, station 5674, 590 fathoms. Others from station 5688, 525 fathoms; 5693, 451 fathoms; 5685, 645

fathoms; and 5677 in 735 fathoms, probably represent the same species, but are not in condition for definite specific determination. Approximate latitudes of these stations run from 33° to 25° , depths from 451 to 868 fathoms.

Color, fresh, black (station 5685).

Plectromus [Melamphæs] lugubris Gilbert

Two of about $3\frac{1}{2}$ inches total length from station 5683 in 630 fathoms off Cape San Lucas, approximate latitude 23° .

Sebastolobus alascanus Bean

Plate II, Figure 3

Numerous specimens from station 5694, off the Santa Barbara Islands, approximate latitude 33° in 640 fathoms.

Sebastolobus altivelis Gilbert

Numerous specimens from station 5693, off the Santa Barbara Islands, in 451 fathoms (approximate latitude 33°). One from station 5683, off Cape San Lucas, 630 fathoms (approximate latitude 23°).

It would seem from the above that, for the same latitude, *altivelis* occurs in shallower water than *alascanus*.

There is also *Sebastolobus* material from several other stations showing intergradation between the two forms. From station 5695 (approximate latitude 34°), off the Santa Barbara Islands, in the intermediate depth of 534 fathoms we have two typical *altivelis*, two specimens which are *altivelis* except for having sixteen dorsal spines, characteristic of *alascanus*, one is an *alascanus* except for fifteen dorsal spines characteristic of *altivelis*, and another with fifteen spines has the longest spine of intermediate length.

From station 5696 (approximate latitude 35°) north of Point Conception, in 440 fathoms, eight specimens are referable to *altivelis*, but one has sixteen spines, two others have the longest spine 2.2 and 2.3 in head respectively, which is a little short for that species.

On the other hand, three specimens from station 5699 (approximate latitude 36°), south of Monterey, California, in 659 fathoms, are intermediate, dorsal spines 16 in one, 15 in two, the longest spine 2.3 to 2.4 in head. A specimen from station 5697 (approximate latitude 36°) in 485 fathoms has dorsal XV, spine of intermediate length.

Of two specimens from station 5698 (approximate latitude 36°), south of Monterey, in 475 fathoms, one is an *altivelis*, the other an

alascanus (with longest dorsal spine 2.8 in head, but spines XV). Five others appear to be *alascanus*, but these are small, averaging 3 inches in length, and small specimens, of which we have a number from the other stations, have been excluded from the above discussion, where they might cause confusion due to our uncertainty regarding age changes.

To sum up, north of Pt. Conception, coastwise in latitude 36° , depths 475 to 659 fathoms, both species occur (at 475 fathoms) but intermediates are the rule. South of Pt. Conception off the Sta. Barbara Islands (latitude 33°) we find *alascanus* (described from Alaska in 159 fathoms) at 640 fathoms, intermediates at 534 fathoms, *altivelis* (described from Alaska in 625 fathoms) at 451 fathoms; and we have a single specimen of *altivelis* off Cape San Lucas (latitude 23°) in 630 fathoms.

Color, fresh, uniformly rose red.

***Zesticelus profundorum* Gilbert**

Two small specimens from station 5695, southwest of the Santa Barbara Islands (approximate latitude 34°), in 534 fathoms.

***Liparis osborni*, new species**

The type (No. 8344, American Museum of Natural History) is our only specimen, collected by the 'Albatross' Lower California Expedition of 1911, north of Pt. Conception, California (approximate latitude 35°), station 5696 in 440 fathoms. Head, $3\frac{3}{4}$

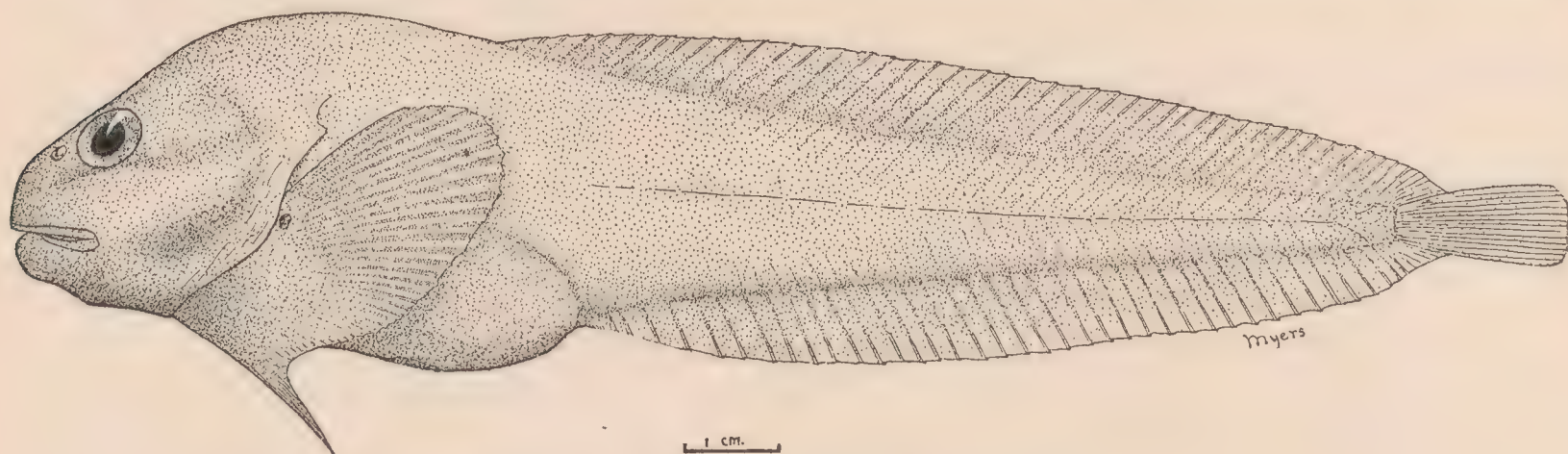


Fig. 4. *Liparis osborni*. Type.

in standard length; depth, $4\frac{1}{10}$; eye, $5\frac{1}{3}$ in head; snout, $3\frac{1}{3}$; maxillary, $2\frac{1}{2}$; interorbital, $3\frac{1}{5}$; pectoral from its upper axil, $1\frac{2}{3}$; length of disk, 3; longest dorsal ray, $3\frac{1}{2}$; longest anal ray $3\frac{1}{2}$; caudal, $2\frac{2}{3}$. Dorsal with 44 rays; anal with 39.

Body swollen in front of anal fin, thence compressed, slender, tapering backward; nape gibbous, profile concave above eye; interorbital flat. Gill opening moderately wide, its width equal to snout, extending for $\frac{1}{3}$ of its length below upper edge of pectoral. Lower rays of pectoral produced in a pointed lobe which reaches vent. Vent equidistant from front of anal and front of disk. Dorsal and anal adnate to caudal for $\frac{1}{3}$ its length. Dorsal origin behind nape, almost directly over the membranous tip of opercle. Caudal narrow, subtruncate, scarcely rounded at tip. Color in spirits whitish, in life uniformly pink.

Named for President Henry Fairfield Osborn of The American Museum of Natural History, a promoter of the 'Albatross' Expedition of 1911.

Careproctus melanurus Gilbert

Plate III, Figure 1

One from station 5693, off the Santa Barbara Islands, approximate latitude 33° , in 451 fathoms.

Color, fresh, pink.

Paraliparis cephalus Gilbert

One from station 5696, approximate latitude 35° (north of Pt. Conception) in 440 fathoms.

Embryx crassilabris (Gilbert)

Plate III, Figure 2.

A specimen ten inches in length from station 5694, approximate latitude 33° (off the Santa Barbara Islands) in 640 fathoms.

Color, fresh, black.

Bothracara mollis Bean

Plate I, Figure 2

A small specimen from station 5699 in 475 fathoms south of Monterey (approximate latitude 36°), and one ten inches long from station 5697, 485 fathoms, a few miles farther south.

Melanostigma pammelas Gilbert

One from station 5693 off the Santa Barbara Islands (approximate latitude 33°) in 451 fathoms.

Color, fresh, jet-black.

Lepophidium emmelas (Gilbert)

Numerous specimens representing four stations off the west coast of Lower California as follows: 5675, 5679, 5680, 5681. Approximate latitudes range from 27° (in 284 fathoms) to 24° (in 325 to 405 fathoms).

Color, fresh, pink above, belly bluish, iris whitish (station 5681).

Lycodapus dermatinus Gilbert

One from station 5696 north of Pt. Conception, California (approximate latitude 35°) in 440 fathoms.

Lycodapus fierasfer Gilbert

One from station 5692 west of San Diego California (approximate latitude 31°) in 1076 fathoms.

Color, fresh, head black, body pale.

Mœbia promelas Gilbert

Plate III, Figure 3

Three specimens from off the west coast of Lower California, approximate latitudes 31° to 26° , from stations 5676, 645 fathoms, 5689 679 fathoms, and 5692, 1076 fathoms.

Merluccius productus (Ayres)

Fourteen specimens from station 5682, in 491 fathoms, of Cape San Lucas (approximate latitude 23°).

Color, fresh, silvery, top of head and fins blackish.

Antimora microlepis Bean

Five specimens from as many different stations (5687, 5693, 5694, 5695, 5696) these being in approximate latitudes 35° (north of Pt. Conception) to 33° (off the Santa Barbara Islands, California) and 28° off northern Lower California, in depths of 440 to 640 fathoms.

Color fresh, pale bluish gray (station 5692, specimen $10\frac{1}{2}$ inches).

Macrourus acrolepis Bean

Plate IV, Figure 1

Numerous specimens representing various stations as follows: 5673, 5689, 5692, 5694, 5695, 5698, 5699. Obtained from southwest of Monterey, California, approximate latitude 36° , 649 fathoms; south to approximate latitude 29° off northern Lower California, and from depths of 534 to 1090 fathoms.

Color, fresh, dark grayish brown (5673). One very large specimen (station 5672) 1 foot 10 inches long, brownish dusky.

Six large specimens, station 5695, plumbeous black, lighter on belly.

Macrourus stelgidolepis Gilbert

Five specimens about 10 inches long from station 5675 off the west coast of Lower California, approximate latitude 27° , in 284 fathoms.

Fresh specimens dark slaty in color.

Macrourus albatrossus, new species

Plate IV, Figure 2

A single specimen (No. 8345, American Museum of Natural History) from station 5692, approximate latitude 31° , west-southwest of San Diego in 1076 fathoms, is clearly different from our other species of *Macrourus*, apparently a representative of a deeper water species. It is not in the best state of preservation, and, although we cannot match it with the description of any known form, we would hesitate to describe it as new were it not that a very satisfactory description can be drawn up with the aid of a plaster cast made of it when caught.

Head, $5\frac{3}{5}$ in total length; depth, $6\frac{1}{10}$. Eye, snout and interorbital equal, $3\frac{2}{3}$ in head; maxillary, $2\frac{1}{3}$; ventral, including filamentous ray, apparently 1; depth at origin 2nd dorsal, 2. Mouth to snout 2 in eye; base of first dorsal $2\frac{1}{2}$ in dorsal interspace. First dorsal with 10 soft rays; anal 101–105.

Orbit impinging on upper profile, its rim slightly raised; interorbital flat; low median ridge on snout ending in a slight knob; suborbital ridge low and rounded ending in a slight knob on side of snout; snout short, broad, blunt; a short low ridge on head above posterior margin of each eye. Height of dorsal slightly exceeding eye and snout; length of pectoral about the same. Origin of first dorsal slightly behind and origin of ventral slightly before origin of pectoral. Second dorsal very low. Depth of body equal to the distance from front of mouth to edge of opercle. Scales ridged, the ridges low, about five to a scale on the back.

Named for the good ship 'Albatross.'

Lionurus liolepis Gilbert

Numerous specimens representing various stations as follows: 5675, 5676, 5682, 5683, 5688, 5697, from north of Point Conception, California, to Cape San Lucas, Lower California, at depths of from 284 to 645 fathoms.

Color, fresh, bluish black (5682).

Embassichthys bathibius (Gilbert)

Plate IV, Figure 3

Four large specimens from depths of 440 to 659 fathoms. Stations 5694, 5696, 5697, 5699, south of Monterey to the Santa Barbara Islands, California.

From station 5696, 440 fathoms, north of Pt. Conception, California, there is also a juvenal individual $2\frac{1}{2}$ inches total length. This is more slender than the adults, depth 2.5 in length.

Color, fresh, black with gray mottling.

Malthopsis erinacea Garman

Plate I, Figure 3

Four specimens from station 5676 in 645 fathoms; and another in too poor condition for positive determination from station 5685 in 645 fathoms. The two stations are near together off the middle of Lower California, approximate latitude 26°.

Color, fresh, slaty (station 5685).

Dibranchus hystrix Garman

One from station 5683, off Cape San Lucas, in 630 fathoms.

SUMMARY

The following forms are new.

NEW GENUS

Bajacalifornia

NEW SPECIES

Polistotrema curtiss-jamesi

Bajacalifornia burragei

Harriotta curtiss-jamesi

Liparis osborni

Macrourus albatrossus

List of Stations with Species Collected at Each

STATION	FATHOMS	
5673	1090	<i>Macrourus acrolepis</i>
		<i>Raja microtrachys</i>
5674	590	<i>Serrivomer sector</i>
		<i>Plectromus cristiceps</i>
		<i>Bajacalifornia burragei</i>
5675	284	<i>Catulus xaniurus</i>
		<i>Nemichthys fronto</i>
		<i>Macrourus stelgidolepis</i>
		<i>Lionurus liolepis</i>
		<i>Plectromus</i> , sp.
		<i>Lepophidium emmelas</i>
5676	645	<i>Halosaurus attenuatus</i>
		<i>Venefica tentaculata</i>
		<i>Mæbia promelas</i>
		<i>Lionurus liolepis</i>
		<i>Malthopsis erinacea</i>
5677	735	<i>Scopelengys dispar</i>
		<i>Venefica tentaculata</i>
		<i>Plectromus cristiceps</i>

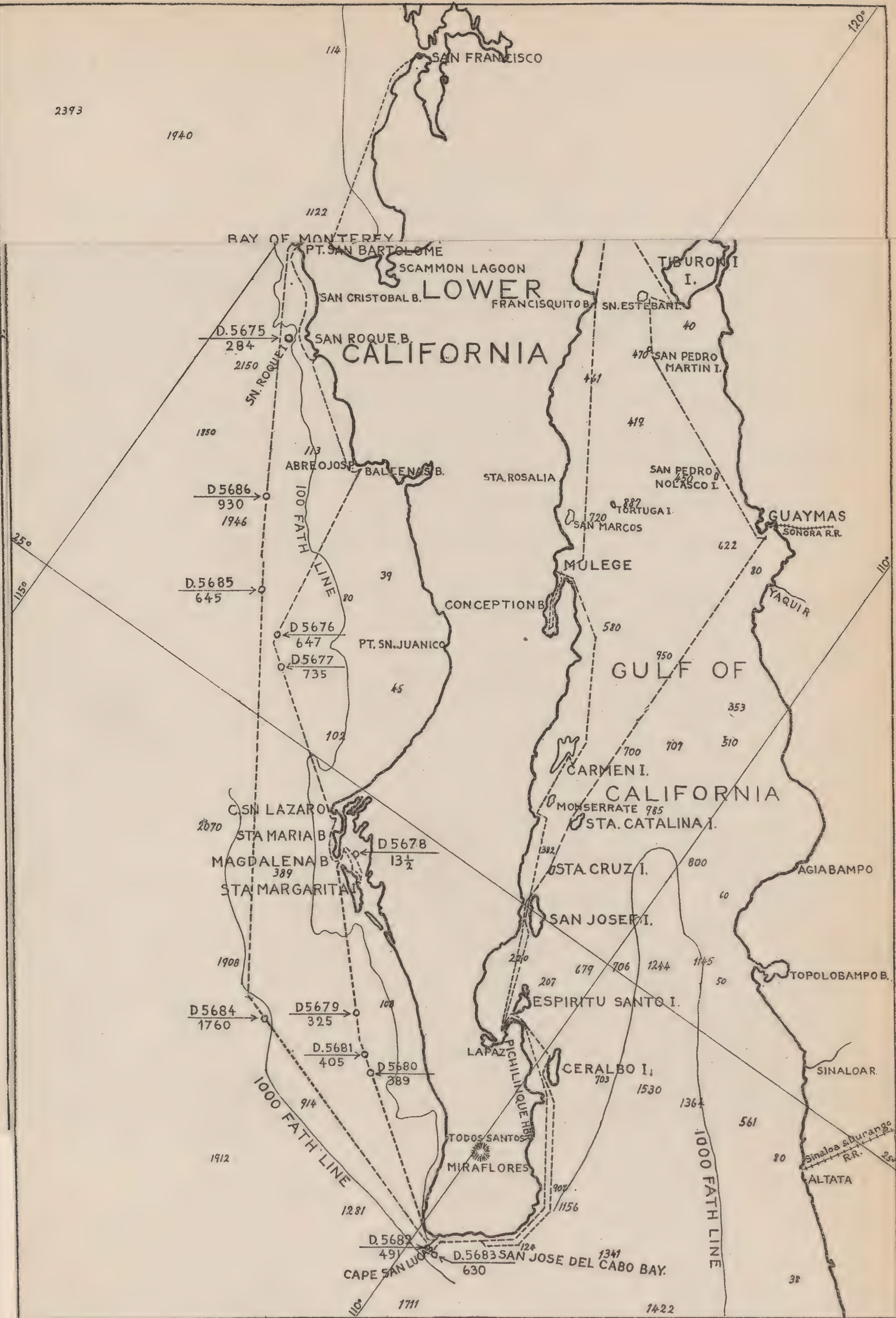
List of Stations with Species Collected at Each (Continued)

STATION	FATHOMS	
5679	325	<i>Lepophidium emmelas</i>
5680	389	<i>Lepophidium emmelas</i> <i>Catulus cephalus</i>
5681	405	<i>Lepophidium emmelas</i> <i>Catulus cephalus</i>
5682	491	<i>Alepocephalus tenebrosus</i> <i>Argyropelecus lichenus</i> <i>Merluccius productus</i> <i>Lionurus liolepis</i>
5683	630	<i>Serrivomer sector</i> <i>Plectromus lugubris</i> <i>Lionurus liolepis</i> <i>Dibranchus hystrix</i> <i>Sebastolobus altivelis</i> <i>Alepocephalus tenebrosus</i>
5684	1760	<i>Bathysaurus mollis</i>
5685	645	<i>Alepocephalus tenebrosus</i> <i>Harriotta curtiss-jamesi</i> <i>Venefica tentaculata</i> <i>Plectromus cristiceps</i> <i>Malthopsis erinacea</i>
5686	930	<i>Argyropelecus affinis</i>
5687	480	<i>Scopelengys dispar</i> <i>Cyclothone acclinidens</i> <i>Nemichthys fronto</i> <i>Plectromus cristiceps</i> <i>Antimora microlepis</i>
5688	525	<i>Alepocephalus tenebrosus</i> <i>Plectromus cristiceps</i> <i>Lionurus liolepis</i>
5689	679	<i>Macrourus acrolepis</i> <i>Mæbia promelas</i>
5690		(No fishes)
5691	868	<i>Cyema atrum</i> <i>Argyropelecus affinis</i> <i>Plectromus cristiceps</i>
5692	1076	<i>Plectromus maxillaris</i> <i>Macrourus acrolepis</i> <i>Macrourus albatrossus</i> <i>Narcetes stomias</i> <i>Lycodapus fierasfer</i> <i>Cyclothone acclinidens</i>
5693	451	<i>Sebastolobus altivelis</i> <i>Antimora microlepis</i> <i>Nannobrachium leucopsarum</i>

List of Stations with Species Collected at Each (Continued)

STATION FATHOMS

		<i>Nannobrachium regale</i>
		<i>Cyclothone acclinidens</i>
		<i>Plectromus cristiceps</i>
		<i>Careproctus melanurus</i>
		<i>Melanostigma pammelas</i>
5694	640	<i>Macrourus acrolepis</i>
		<i>Alepocephalus tenebrosus</i>
		<i>Raja trachura</i>
		<i>Nannobrachium leucopsarum</i>
5694	640	<i>Sebastolobus alascanus</i>
		<i>Embassichthys bathibius</i>
		<i>Antimora microlepis</i>
		<i>Embryx crassilabris</i>
5695	534	<i>Myctophum californiense</i>
		<i>Zesticelus profundorum</i>
		<i>Polistotremus curtiss-jamesi</i>
		<i>Nannobrachium regale</i>
		<i>Plectromus maxillaris</i>
		<i>Antimora microlepis</i>
		<i>Macrourus acrolepis</i>
5696	440	<i>Embassichthys bathibius</i>
		<i>Paraliparis cephalus</i>
		<i>Liparis osborni</i>
		<i>Sebastolobus altivelis</i>
		<i>Polistotremus curtiss-jamesi</i>
		<i>Catulus brunneus</i>
		<i>Lycodapus dermatinus</i>
		<i>Antimora microlepis</i>
		<i>Embassichthys bathibius</i>
5697	485	<i>Polistotrema curtiss-jamesi</i>
		<i>Nannobrachium leucopsarum</i>
		<i>Sebastolobus altivelis</i>
		<i>Bothrocara mollis</i>
		<i>Lionurus liolepis</i>
		<i>Embassichthys bathibius</i>
		<i>Chauliodus sloanei</i>
5698	475	<i>Polistotrema curtiss-jamesi</i>
		<i>Sebastolobus altivelis</i>
		<i>Macrourus acrolepis</i>
5699	659	<i>Sebastolobus altivelis</i>
		<i>Bothrocara mollis</i>
		<i>Macrourus acrolepis</i>
		<i>Embassichthys bathibius</i>



MAP OF THE LOWER CALIFORNIA REGION
 SHOWING ROUTE OF THE ALBATROSS EXPEDITION IN 1911
 UNDER THE DIRECTION OF C.H. TOWNSEND

PLATES I TO IV

PLATE I

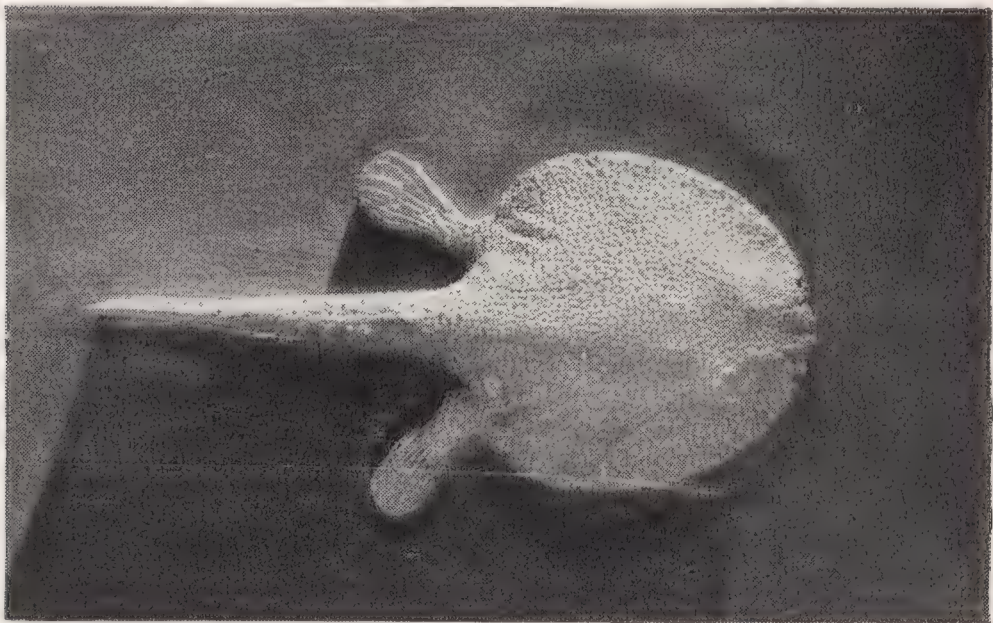
- Fig. 1. *Bathysaurus mollis* Günther.
Fig. 2. *Bothrocara mollis* Bean.
Fig. 3. *Malthopsis erinacea* Garman.



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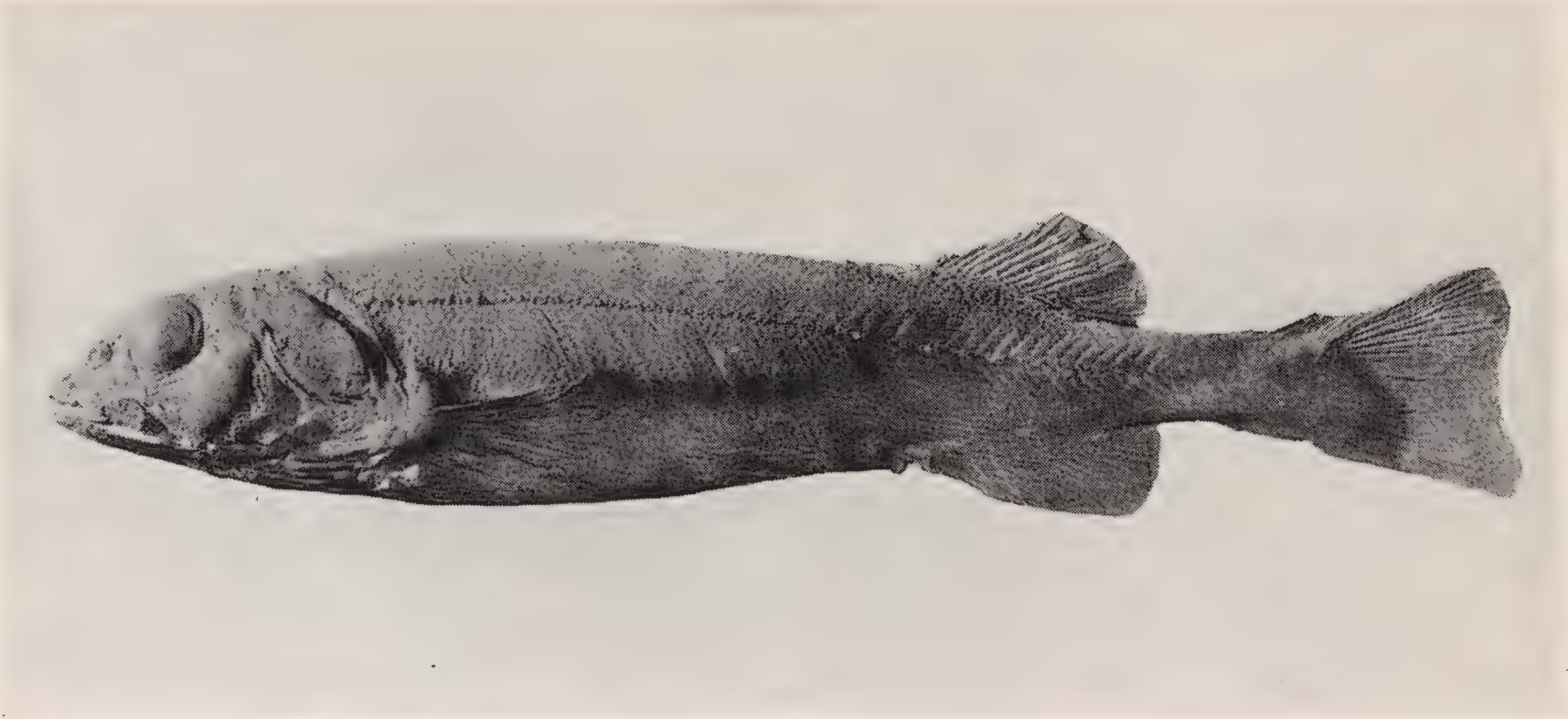
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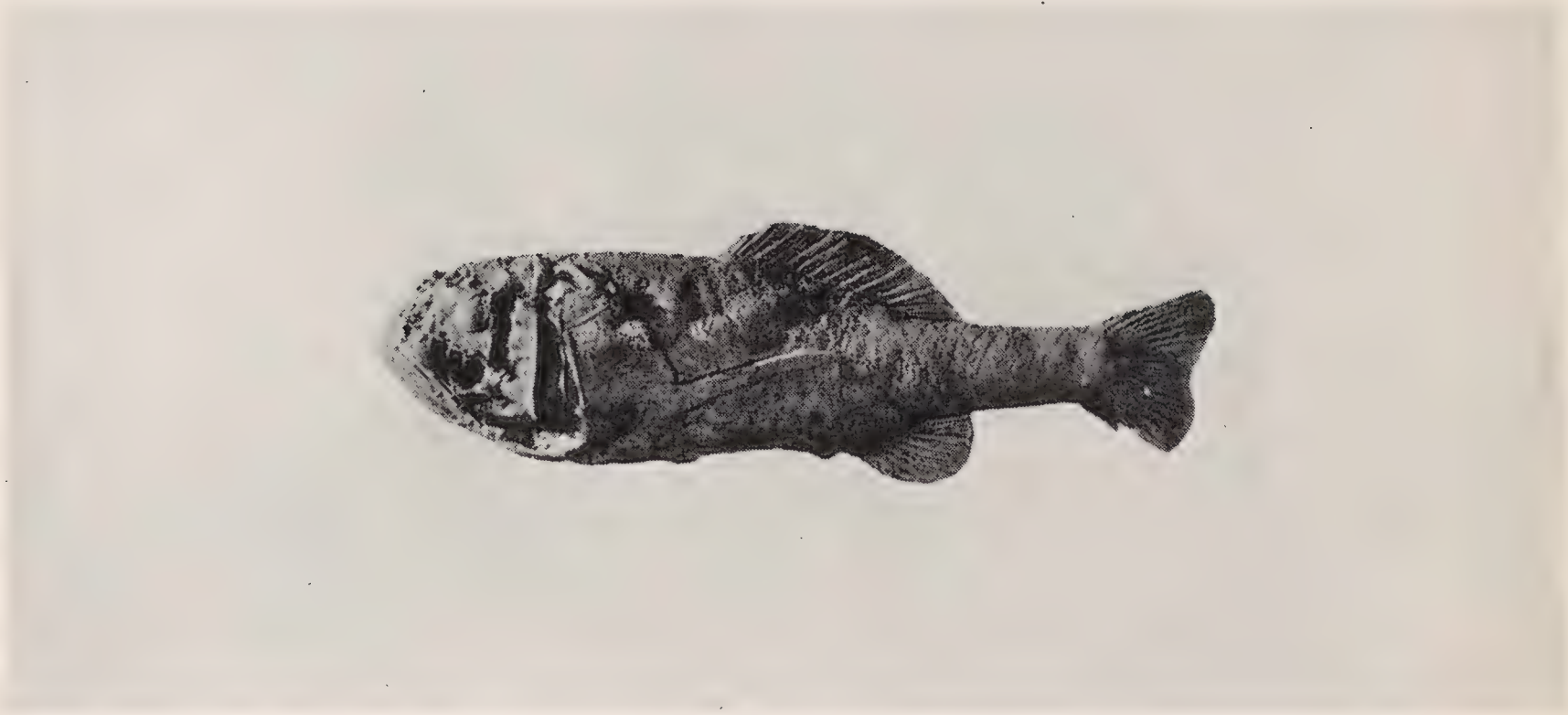
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PLATE II

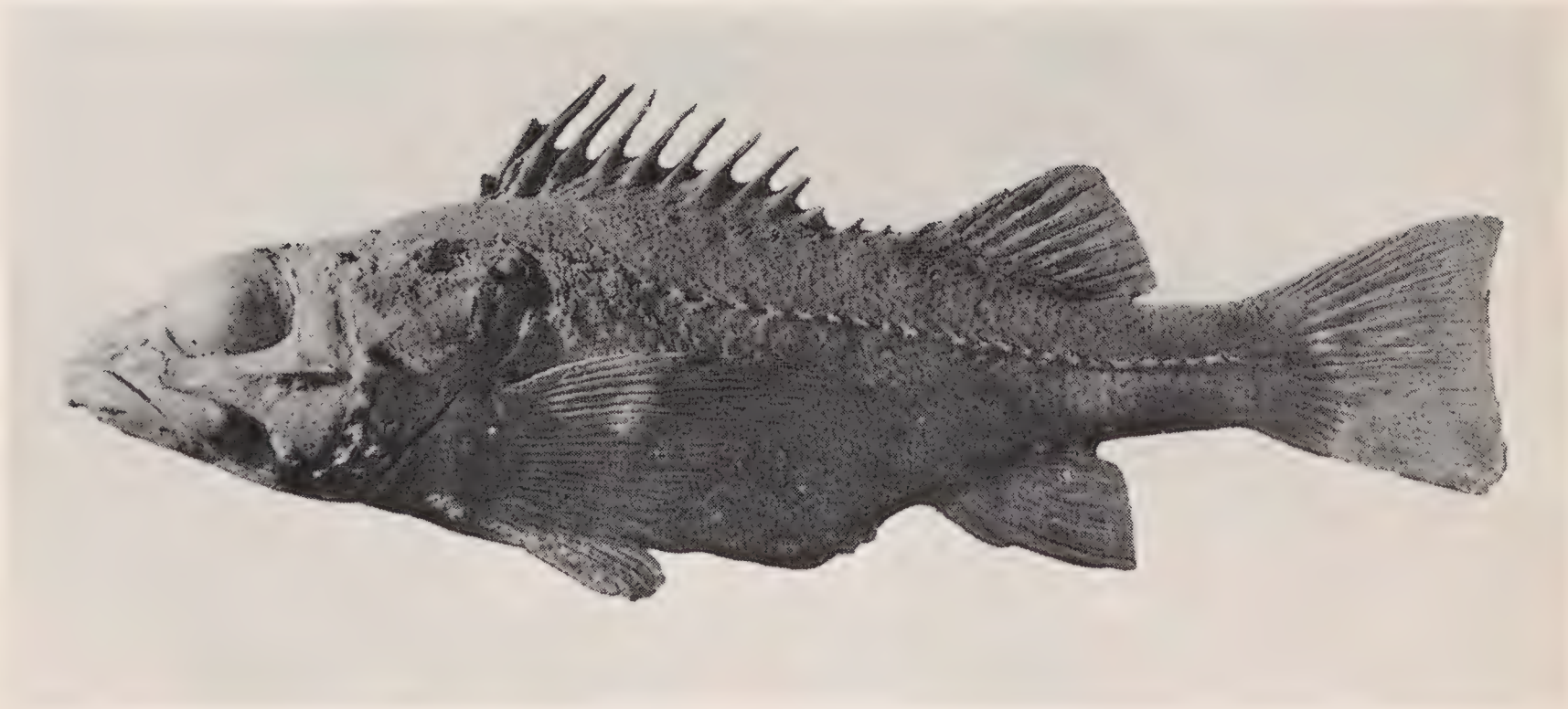
- Fig. 1. *Alepocephalus tenebrosus* Gilbert.
Fig. 2. *Plectromus cristiceps* Gilbert.
Fig. 3. *Sebastolobus alascanus* Bean.



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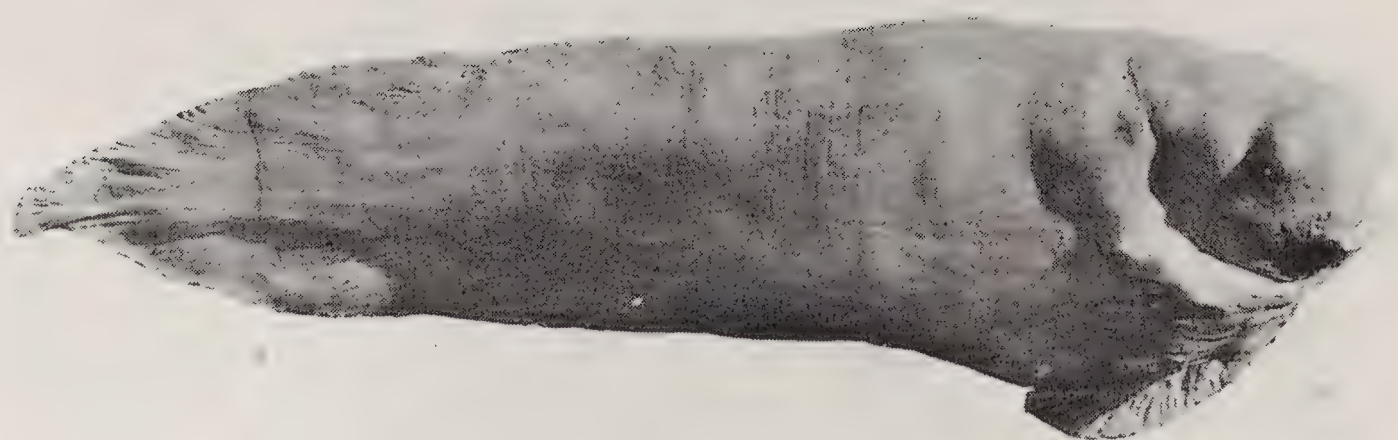
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PLATE III

- Fig. 1. *Careproctus melanurus* Gilbert.
Fig. 2. *Embryx crassilabris* (Gilbert).
Fig. 3. *Mæbia promelas* Gilbert.



1



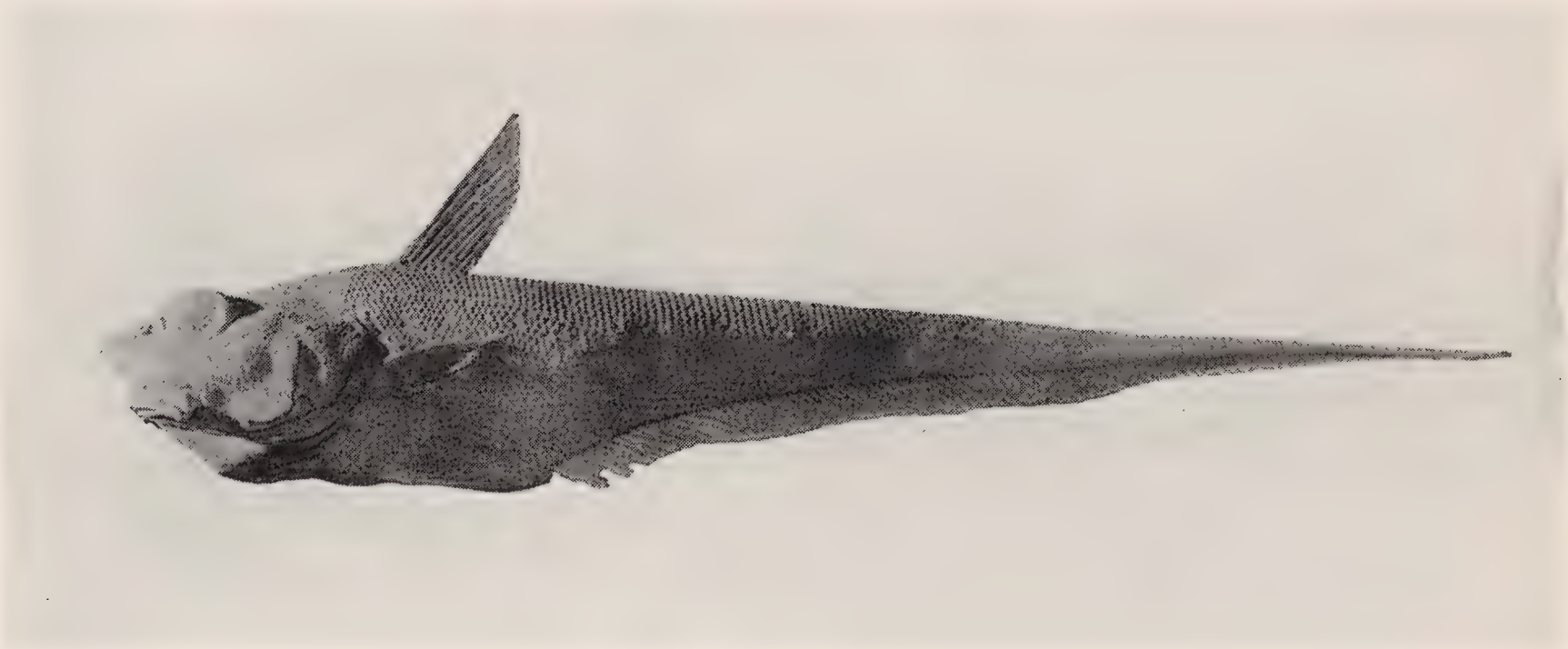
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PLATE IV

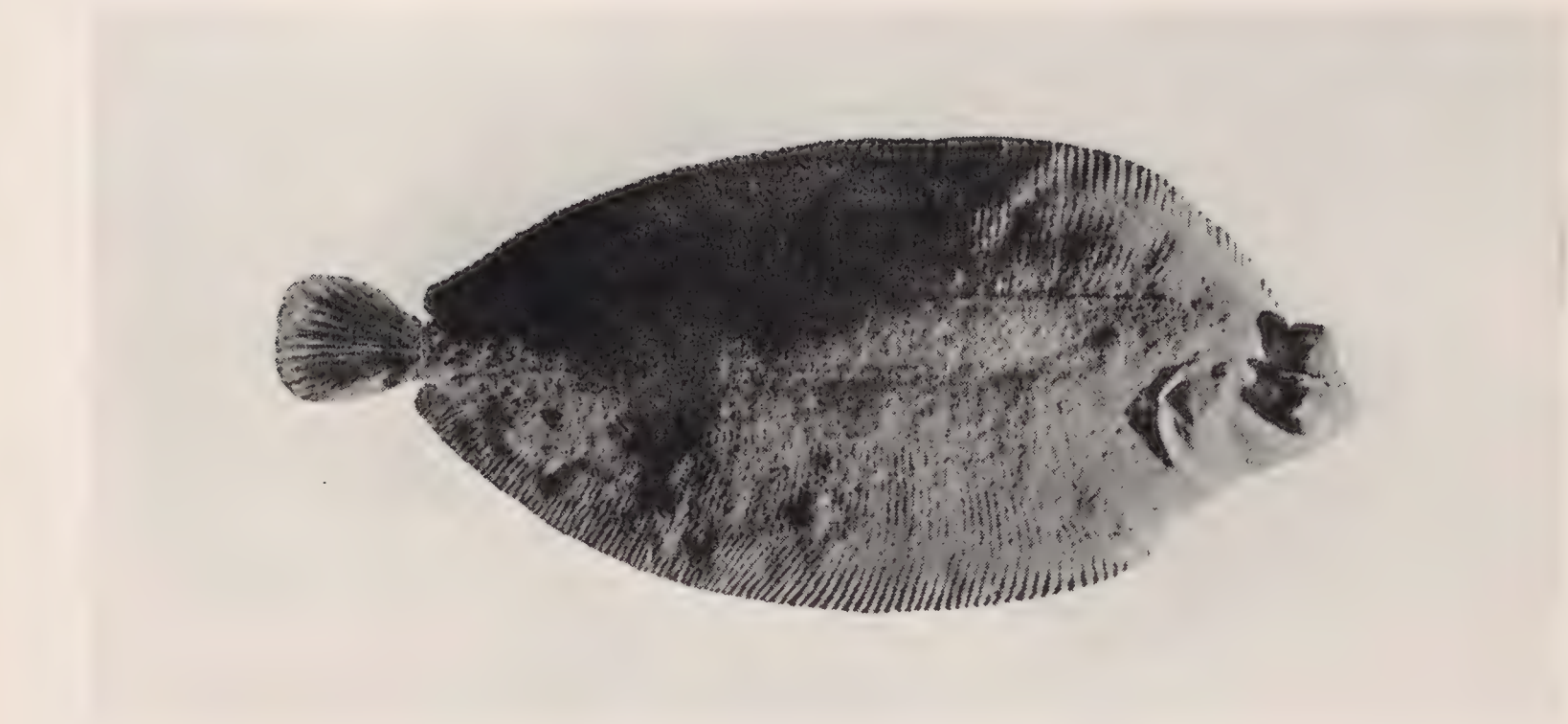
- Fig. 1. *Macrourus acrolepis* Bean.
Fig. 2. *Macrourus albatrossus* Townsend and Nichols, type.
Fig. 3. *Embassichthys bathibius* (Gilbert).



1



2



3

Article II.—THE AMPHIPODA COLLECTED BY THE UNITED STATES FISHERIES STEAMER 'ALBATROSS' IN 1911, CHIEFLY IN THE GULF OF CALIFORNIA¹

BY CLARENCE R. SHOEMAKER

While the collection of Amphipods procured on this cruise of the 'Albatross' is comparatively small, it has, nevertheless, been found to contain a large percentage of new forms. As this is the first collection of Amphipods to be worked up from this little-known region, it is not surprising that many new forms should appear. Among the one hundred and sixty-seven specimens of the collection, thirteen families, sixteen genera, and sixteen species are represented. Three genera and eight species are new to science.

The genus *Batea* was described in 1865 by Fritz Müller from the coast of Brazil, and it is now for the first time reported from the West Coast of North America. The hyperiid genera *Anchylomera*, *Symprone*, *Lycaea*, *Platyscelus*, *Tetrathyrus*, and *Amphithyrus* also are new records for the West Coast.

LIST OF SPECIES COLLECTED

<i>Heterophoxus pennatus</i> ,	new species.	Pichilique Bay.
<i>Paraphoxus spinosus</i>	Holmes.	Carmen Island.
<i>Ædiceropsoides abyssorum</i> ,	new species.	Sta. D. 5689.
<i>Batea rectangulata</i> ,	new species.	San Francisquito Bay.
<i>Elasmopus</i>	species.	Sta. D. 5678.
<i>Bemlos macromanus</i> ,	new species.	No definite locality.
<i>Vibilia californica</i>	Holmes.	Agua Verde Bay.
"	"	Carmen Island.
"	"	Guadalupe Island.
<i>Hyperia</i>	species.	San Josef Island.
"	"	Carmen Island.
<i>Anchylomera blossevillii</i>	M.-Edw.	Cape San Lucas.
<i>Symprone anomala</i> ,	new species.	Cape San Lucas.
"	"	Agua Verde Bay.
<i>Brachyscelus crusculum</i>	Bate.	Carmen Island.
"	"	San Josef Island.
"	"	Cape San Lucas.
"	"	Agua Verde Bay.

¹Scientific Results of the Expedition to the Gulf of California in charge of C. H. Townsend, by the U. S. Fisheries Steamship 'Albatross,' in 1911. Commander G. H. Burrage, U. S. N., commanding. XV. Published by permission of the U. S. Commissioner of Fisheries.

<i>Lycæa bajensis</i> , new species.	San Josef Island.
“ “ “ “	Cape San Lucas.
“ “ “ “	Carmen Island.
<i>Parascelus zebu</i> Stebbing.	Carmen Island.
<i>Platyscelus dubius</i> , new species.	Cape San Lucas.
“ “ “ “	Carmen Island.
“ “ “ “	San Josef Island.
“ “ “ “	Agua Verde Bay.
<i>Tetrathyrus sancti-josephi</i> , new species.	San Josef Island.
“ “ “ “ “	Agua Verde Bay.
“ “ “ “ “	Carmen Island.
<i>Amphithyrus orientalis</i> Stebbing.	San Josef Island.

GAMMARIDEA

Phoxocephalidæ

HETEROPHOXUS, new genus

Body not very broad. Head with evenly vaulted hood, not carinate or deflexed. Eyes well-developed. Side-plates plumose, fourth broadly produced backward, fifth with oblique hind lobe. Eyes very large, oval, black. Antenna 1 in ♂, first joint very large, flagellum in ♂ with calceoli and sensory clubs. Antenna 2 in ♂, lower anterior corner of second joint produced into a prominent lobe, flagellum nearly as long as body, fifth joint and flagellum with calceoli. Mandible, cutting edge and spine-row well developed, accessory cutting plate present, molar feeble, tipped with three spine-teeth, palp linear with few setæ, third joint very little shorter than second. Maxilla 1, palp 1-jointed, well developed, inner plate well developed with two setæ. Maxilla 2, plates subequal. Maxilliped, outer plate reaching nearly to middle of second joint of palp, inner plate obtusely rounded at apex, third joint of palp not produced, fourth very short, tipped at apex with two long curved spines. Gnathopods and peræopods much as in *Harpinia*. Peræopod 3, second joint not expanded. Peræopod 4 much longer than the rest, second joint narrowed distally. Peræopod 5 rather small, second joint much expanded. Uropod 3 in ♂ well developed, outer ramus the shorter and both rami bearing long, plumose setæ. Telson rather short and broad, cleft a little over half its length, lobes broadly rounded apically.

Heterophoxus pennatus, new species

TYPE LOCALITY.—Pichilique Bay, Gulf of California, March 28–29, 1911, electric light; 2 specimens (1 ♂ type).

MALE.—Head with evenly vaulted hood, broadly rounded in front and reaching just beyond the end of the second joint of antenna 1, postero-antennal angles quadrate. Eyes large, oval, black, and nearly meeting at top of head. Antenna 1, first joint very large, provided on the lower anterior corner with numerous sensory bristles and several plumose setæ, second joint about half the length and width of first, third joint about half the length and width of second, flagellum about the length of the first joint of the peduncle and composed of eight joints which are provided with sensory clubs and a few calceoli, accessory flagellum half the length of the primary and composed of five joints. Antenna 2 nearly as long as the entire animal, second joint

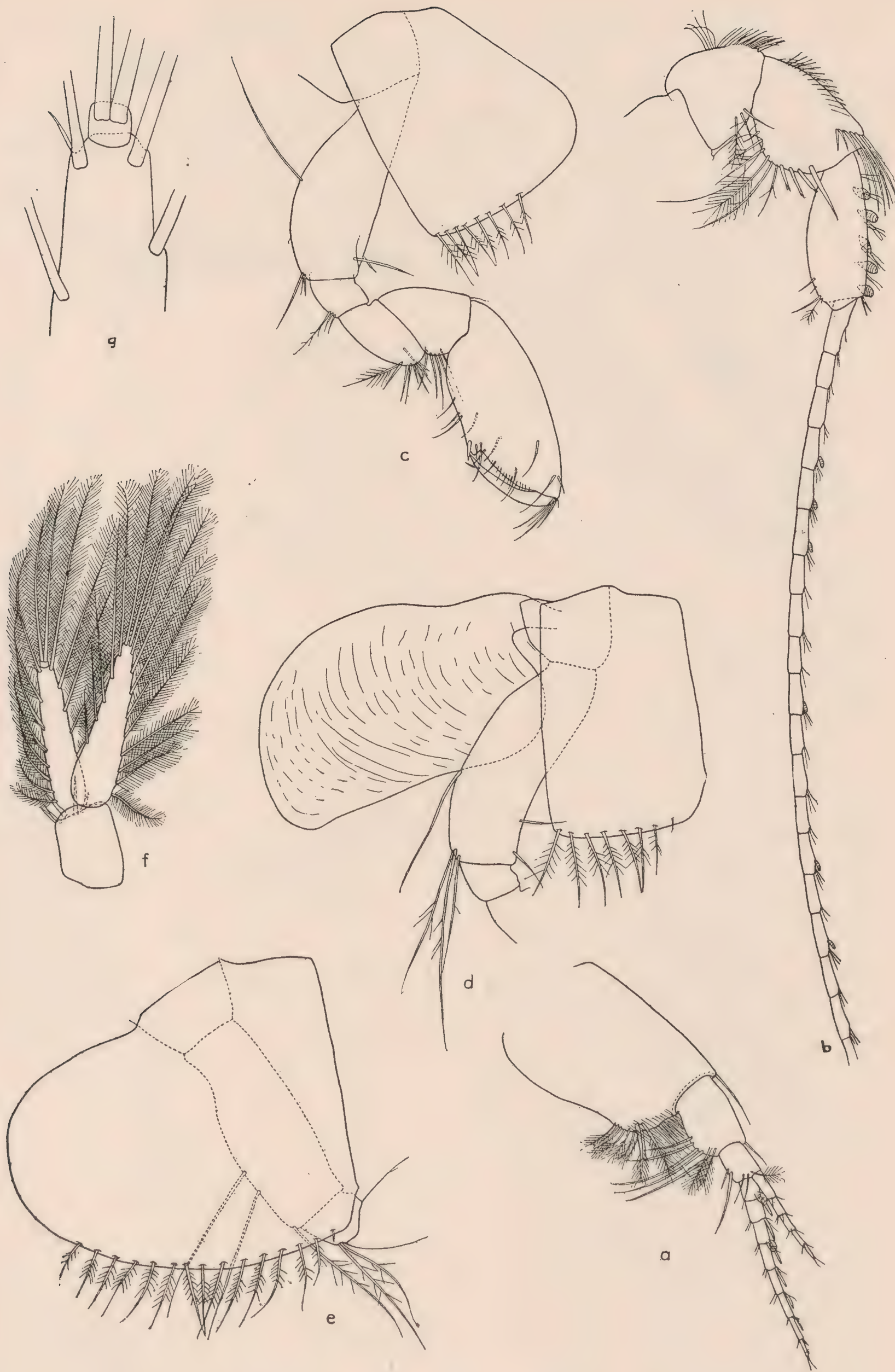


Fig. 1. *Heterophoxus pennatus*, new species

MALE.—*a*, antenna 1; *b*, antenna 2; *c*, gnathopod 1; *d*, gnathopod 2; *e*, peraeopod 2; *f*, uropod 3, right side; *g*, end of outer ramus of uropod 3 showing minute second joint.



Fig. 2. *Heterophoxus pennatus*, new species

MALE.—*a*, peraeopod 1; *b*, peraeopod 3; *c*, peraeopod 5; *d*, end of dactyl of peraeopod 5; *e*, peraeopod 4.



Fig. 3. *Heterophoxus pennatus*, new species

MALE.—*a*, abdomen, uropods and telson; *b*, mandible; *c*, cutting edge, spine-teeth and molar spine-teeth of mandible; *d*, telson; *e*, maxilla 1; *f*, maxilla 2; *g*, maxilliped.

with prominent, forward-pointing lobe on lower anterior corner, third joint short and thick, fourth joint a little longer than third, lower margin very convex and provided with several long plumose setæ and short blunt spines, fifth joint a little longer than fourth, lower margin evenly convex, upper margin provided with calceoli and short bristles, flagellum very long and slender and provided with calceoli on the upper anterior ends of the joints. Mandible, cutting edge narrow, accessory plate well developed, nine very well-developed spine-teeth, molar prominence surmounted by three strong spine-teeth, palp slender, third joint slightly shorter than second with oblique end provided with several long setæ, and several setæ on lower margin of joint near distal end. Maxilla 1, palp twice as long as outer plate with several spines on rounded apex, outer plate short and provided with nine curved spine-teeth, some of which are serrate and some bifurcate, inner plate nearly as large as outer and bearing on its rounded apex two plumose setæ. Maxilla 2, plates subequal, and bearing many curved spines and setæ on their rounded ends. Maxilliped, outer plate reaching nearly to the middle of second joint of palp and provided on its rounded end and inner edge with curved serrate spines, inner plate short with rounded end, provided with long plumose setæ, palp with third joint rather short, dactyl short and tipped with two long curved spines. Side-plate 1 expanded distally and provided on the posterior half of the lower edge with plumose setæ; side-plate 4 broadly expanded posteriorly, lower edge provided with plumose setæ; side-plate 5, posterior lobe oblique with plumose setæ on lower rounded edge. Gnathopods 1 and 2 as in *Harpinia plumosa* (Krøyer). Peræopods 1-3 as in *Harpinia plumosa* (Krøyer). Peræopod 4, second joint little expanded at proximal end and not at all at distal end, front margin convex, hind margin nearly straight and bearing a row of plumose setæ, fourth, fifth and sixth joints linear, sixth joint provided on front edge and distal end with long, slender spines, some of which are tipped with a very fine hair-like setule, dactyl long and slender. Peræopod 5 short, second joint expanded backward and decidedly downward, hind margin serrate with plumose setæ between the serrations, third and fourth joints short and broad, fifth and sixth joints linear, dactyl very nearly as long as sixth joint and bearing a tooth near the apex. Pleon segment 3, lower posterior angle produced into an acute upward-pointing tooth above which the margin is slightly convex, lower margin convex and bearing a row of plumose setæ. Uropod 3 not extending backward as far as uropod 1, peduncle short and thick, rami knife-shaped and bearing on their margins and apices long plumose setæ, outer ramus a little shorter than inner with very minute second joint. Telson extending a little beyond the peduncle of uropod 3, about as long as broad, cleft a little beyond the middle, lobes rounded apically and each bearing a minute spinule at the outer distal edge, two minute plumose setules and a minute spinule on each other edge.

LENGTH.—5 mm.

Paraphoxus spinosus Holmes

Paraphoxus spinosus HOLMES, 1903, American Naturalist, XXXVII, p. 276.

Paraphoxus spinosus HOLMES, 1905, Bulletin of the Bureau of Fisheries for 1904, XXIV, p. 477, text figure.

Paraphoxus spinosus KUNKEL, 1918, State of Connecticut. State Geological and Natural History Survey, Bulletin No. 26, p. 76, text fig. 13.

Carmen Island, southeast side, Gulf of California, electric light; 14 specimens.

This species was described by S. J. Holmes from the New England coast of the United States and it is now recorded for the first time from the western coast of America.

Ædicerotidæ

ÆDICEROPSOIDES, new genus

FEMALE.—Rostrum or frontal process long and narrow. Eyes absent. Lateral lobes of head produced and truncated. Antenna 1 well developed, not short. Antenna 2 about half the length of the body, fourth joint of peduncle large, flagellum of many calceoliferous joints. Upper lip with margin evenly convex. Mandibular palp elongate. Maxilla 2, inner plate much wider than outer. Plates of maxillipeds rather broad in proportion to length. Side-plates 1–4 rather large, first expanded distally, fourth with hind margin slightly concave. Gnathopods 1 and 2 very much alike but 2 a little the larger, fifth joint large with prominent setose lobe, sixth joint longer than fifth, ovate, palm much longer than hind margin. Peræopods 1 and 2 rather feeble, 3 and 4 strong, 5 long. Pleon segments 1–3, postero-lateral corners very rounding. Abdominal segments 4–6 missing from the single specimen dredged.

Ædiceropsoides abyssorum, new species

TYPE LOCALITY.—Station 5689. East of Guadalupe Island: Hat Mt., N. 59° E.; St. Vincent Peak, N. 47° E. (29° 32' N., 116° 14' W.), 879 fathoms; 1 specimen.

FEMALE.—Head about as long as the first three segments of body, rostrum long, narrow, evenly rounded at apex, curved slightly downward and reaching just to the end of the first joint of antenna 1, lateral lobes prominently produced forward and obliquely truncated. Eyes absent. Antenna 1 reaching to the end of the fifth joint of antenna 2, flagellum equal in length to the peduncle. Antenna 2, fourth and fifth joints long, fifth about four-fifths as long as fourth, two long curved spines on inside margin and three at the distal end. Flagellum nearly as long as peduncle, composed of many short calceoliferous joints. Upper lip evenly rounded on lower edge. Mandible short and stout, cutting-edge with few teeth, small, dark tooth at base of cutting edge, eight teeth in spine row, molar very prominent with triturating surface concave, palp long, third joint nearly as long as second, second and third joints provided on their lower edges with a row of spines. Maxillæ 1 and 2 nearly as in *Ædiceropsis brevicornis* Lillj. Maxillipeds much as in *Æ. brevicornis* Lillj., except that the outer plate and the second joint of the palp are comparatively broader. The distal edge of the palp of maxilla 1, the distal edge of the inner and outer plates of maxilla 2, the inner edge of the outer plate of maxillipeds, and the inner edge of the second joint and the distal edge of the third joint of the palp of maxillipeds are provided with elongate, cylindrical appendages, which become very easily detached. Side-plate 1 greatly expanded and extended straight forward. Side-plate 2 comparatively narrow with sides nearly parallel. Side-plate 3 much broader than 2, with sides nearly parallel. Side-plate 4 deeper than 3, front margin convex and hind margin slightly concave. Side-plate 5 a little over half the depth of 4, front lobe much larger than hind lobe.



Fig. 4. *Ædiceropsoides abyssorum*, new species

FEMALE.—*a*, head, first two thoracic segments, and antennæ; *b*, mandible; *c*, mandibular palp; *d*, cutting edge, spine-teeth, and molar of mandible; *e*, spine-teeth of mandible; *f*, maxilla 1; *g*, maxilla 2; *h*, maxilliped; *i*, lower lip.

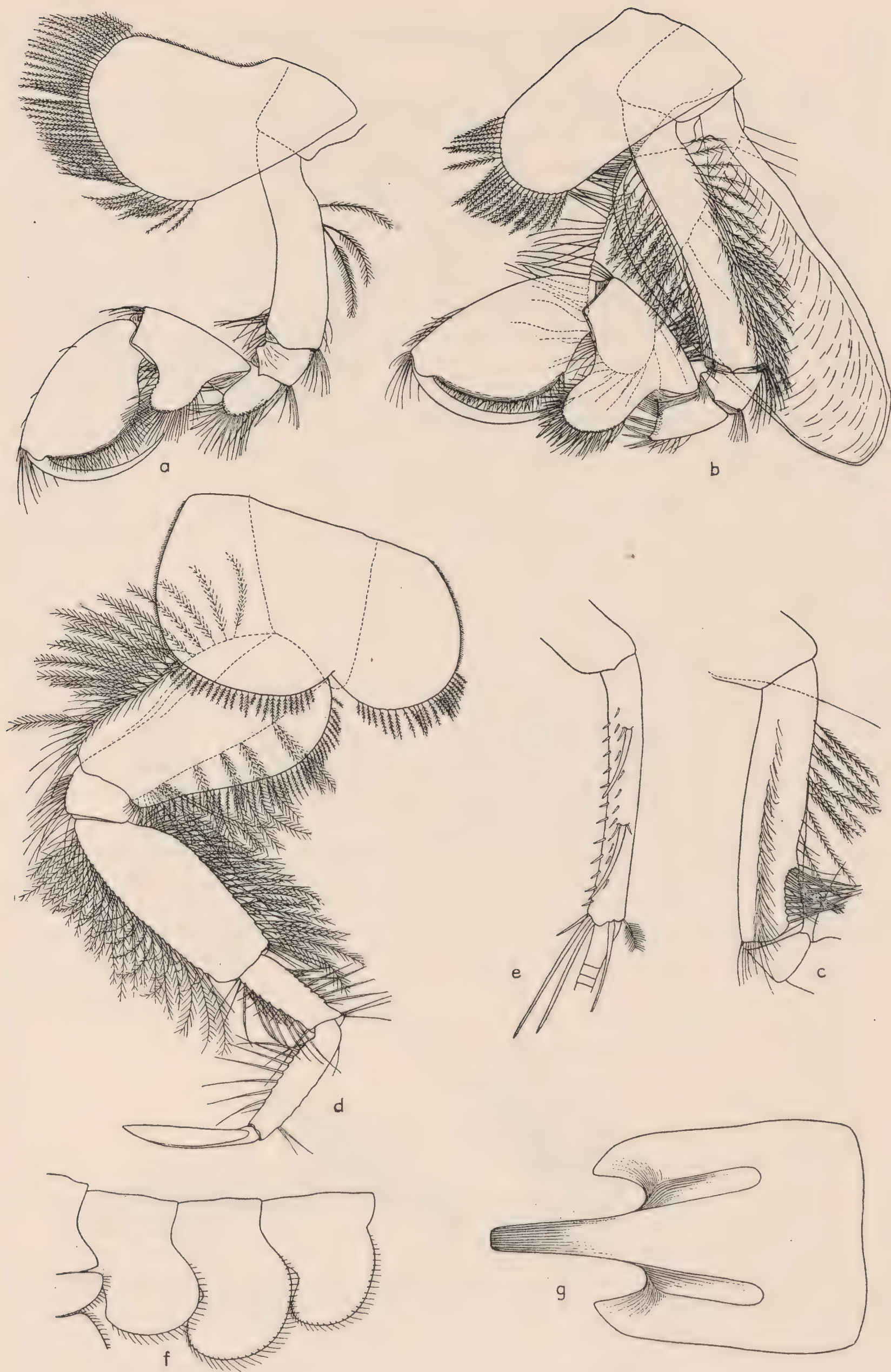


Fig. 5. *Ædiceropsoides abyssorum*, new species

FEMALE.—*a*, gnathopod 1; *b*, gnathopod 2; *c*, inside view of second joint of gnathopod 2; *d*, peræopod 3; *e*, inside view of fifth joint of antenna 2; *f*, abdominal segments 1-3; *g*, dorsal view of head.

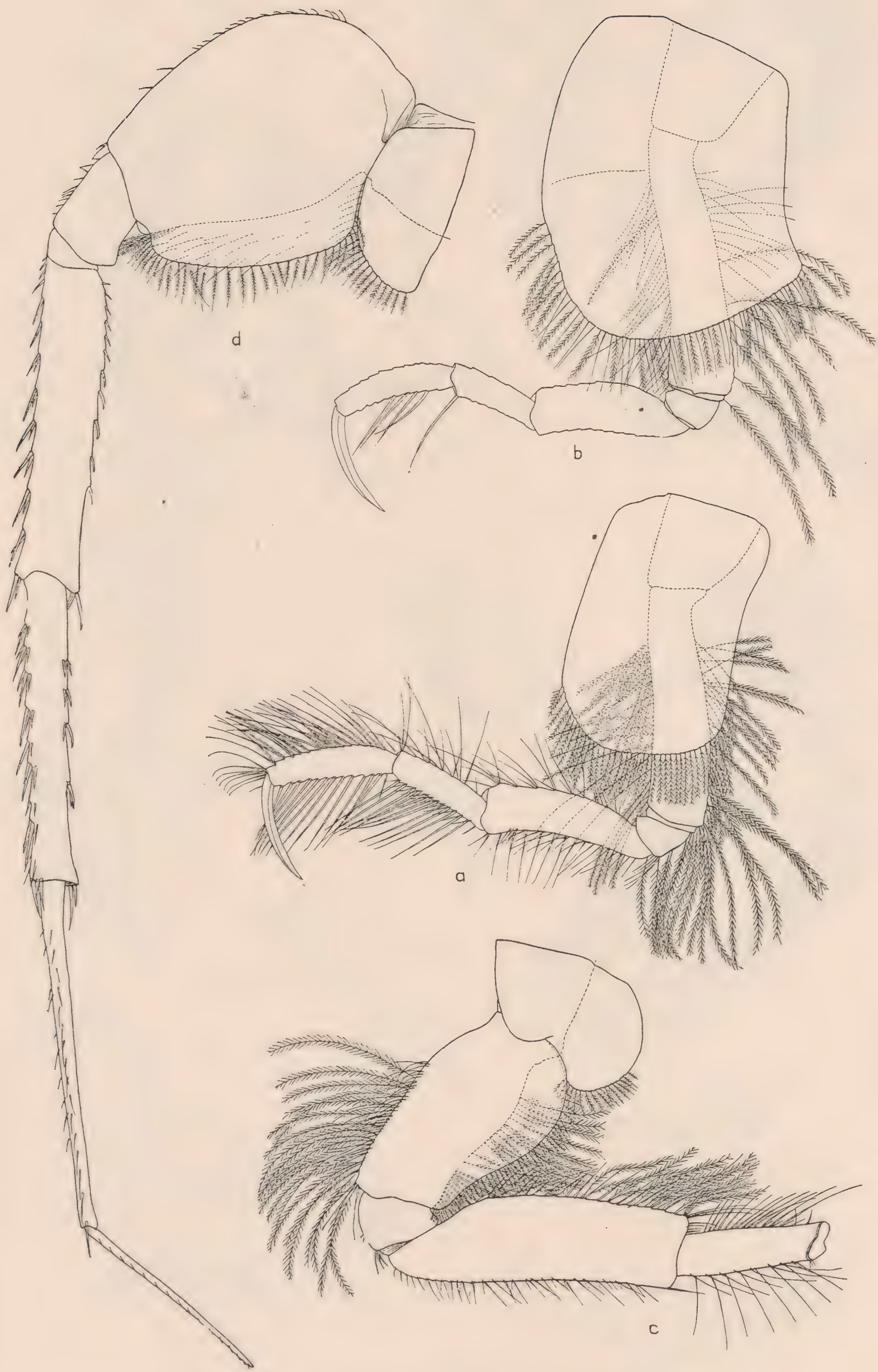


Fig. 6. *Ædiceropsoides abyssorum*, new species
 FEMALE.—*a*, peraeopod 1; *b*, peraeopod 2; *c*, peraeopod 4; *d*, peraeopod 5.

Side-plate 6 shallower than 5, hind lobe much deeper than front lobe. Side-plate 7 shallow, widest at upper margin. All side plates fringed with plumose setæ. Gnathopods 1 and 2 very much alike, 2 a little the stouter. Gnathopod 1, second joint slender, slightly curved, and with an oval depression surrounded by stout bristles on the inner distal end, fourth joint short with lower margin evenly convex and furnished with many bristles, fifth joint as wide as sixth and about two-thirds as long, lower margin produced into a prominent lobe, the edge of which is provided with many bristles, sixth joint stout, more or less oval, palm very convex, much longer than hind margin, defined by a prominent bristle and furnished throughout with many fine bristles, finger long, slender, smooth, and of about the curvature of the palm. Gnathopod 2, second joint slender, provided on front and hind margins with plumose setæ, and on the inside distal end with an oval depression surrounded by stout bristles, fourth joint short with lower margin produced into a blunt point, fifth joint wider than sixth and about two-thirds as long, lower margin produced into a very prominent lobe which is edged with many stout bristles, sixth joint and finger as in gnathopod 1 but a little stouter. Peræopods 1 and 2 long and slender, first joint provided on front and hind margins and inner surface with many long, plumose setæ, fourth, fifth and sixth joints are provided on their front and back margins with many long stout spines, dactyls flat, and nearly as long as sixth joints. Peræopod 3, stout, second joint widest above, hind margin evenly convex above and nearly straight below, both front and hind margins provided with long plumose setæ, fourth joint densely clothed on inner surface and front and hind margins with long plumose setæ, fifth joint about one-half as long as fourth and two-thirds as long as sixth, fifth and sixth joints provided on their front and hind margins with many stout bristles, dactyl broad and flat, and equal in length to sixth joint. Peræopod 4 with sixth joint and dactyl missing, in general outline much like peræopod 3, but longer, and less plumose on fourth joint. Peræopod 5 long and slender, second joint widest through the upper third, hind margin slightly convex and provided with plumose setæ, fourth joint very slightly longer than fifth, sixth joint very slightly longer than fourth, dactyl nearly two-thirds as long as sixth joint. Abdominal segments 1-3 with lower margins evenly rounded and provided with a fringe of plumose setæ, segment 2 the deepest. Fourth, fifth, and sixth segments missing.

LENGTH.—From tip of rostrum to end of third abdominal segment 24 mm.

Bateidæ

Batea rectangulata, new species

TYPE LOCALITY.—San Francisquito Bay, Gulf of California, electric light; 1 specimen.

FEMALE.—This single female specimen is the first of this genus to be described from the west coast of America, all previous records having been from Brazil, West Indies, and the east coast of the United States. There are several very definite characters which differentiate it from the east coast species. Antennæ missing excepting the first few joints of the peduncles. Eyes too badly distorted for any definite outline to be discerned. Head with rostrum strongly curved downward and acutely pointed. Mandibles with five spine-teeth on left and four on right, third joint of palp about two-thirds as long as second, and provided on distal half of inner margin with many long, curved minutely-plumosed setæ, and near the proximal end of outer



Fig. 7. *Batea rectangularata*, new species
 FEMALE.—*a*, gnathopod 1; *b*, gnathopod 2; *c*, peræopod 1; *d*, peræopod 5.



Fig. 8. *Batea rectangularata*, new species

FEMALE.—*a*, gnathopod 2 showing teeth of palm and finger; *b*, peraeopod 2; *c*, peraeopod 3; *d*, peraeopod 4.



Fig. 9. *Batea rectangularata*, new species

FEMALE.—*a*, head and first two thoracic segments; *b*, left mandible; *c*, palp of left mandible; *d*, right mandible; *e*, palp of right mandible; *f*, maxilla 1; *g*, maxilla 2; *h*, maxilliped; *i*, lower lip.

margin with two long, curved, minutely-plumosed setæ. One of the distal spines of the third joint of palp is much enlarged, making it appear quite dactyl-like. Second joint of palp with stout setæ on distal half of inner margin. Lower lip without inner lobes, or at best only a mere suggestion of them. Maxilla 1, inner plate with seven plumose setæ, below which are several setules, outer plate provided with ten or eleven very stout, curved, toothed spine-teeth, palp with first joint about two-thirds the length of second, second joint evenly rounded distally and provided with many short spines. Maxilla 2 with both plates evenly rounded distally, inner plate furnished with two plumose setæ and many long, sharp spines, outer plate furnished distally with many long, sharp, curved spines. Maxillipeds, inner plate reaching to about the middle of the first joint of the palp, armed on truncated end and along inner margin with long, plumose setæ, one sharp spine-tooth among the setæ on the truncated end of this plate could be discerned, but if others were present they were completely hidden by the mass of surrounding plumose setæ, outer plate reaching beyond the second joint of palp and provided on the inner edge with twelve tooth-like spines, no plumose setæ at distal end of this plate, outer edge provided with a row of fine setules. The three joints of the palp all of equal length, dactyl stout with downward-pointing tip. Gnathopod 1 with the terminal spines of second-joint much as in *B. catharinensis*, front margin with five or six long setæ, and two long curved setæ near the distal end of hind margin. Gnathopod 2 proportionately longer and more slender than in *B. catharinensis*, second joint very slender and nearly as long as the third, fourth, fifth and sixth joints combined, fifth joint slender and slightly longer than sixth, sixth joint slender, palm oblique, about two-thirds the length of hind margin and minutely serrate throughout its length, dactyl slightly curved and bearing four forward-pointing teeth and several setules on inner margin. Peræopod 1, fifth and sixth joints missing, second joint with a row of short, slender spines on front margin and two groups of long bristles near the distal end of hind margin. Peræopod 2, fifth and sixth joints missing, second, third and fourth joints about as in peræopod 1. Peræopod 3, second joint with lobe of hind margin rounding and without any downward dip. Peræopod 4, second joint not wider above than below, but about the same width throughout, hind margin evenly convex. Peræopod 5, second joint about as broad as long, lower posterior margin not forming as deep a lobe as in *B. catharinensis*. Side-plates all much deeper than in *B. catharinensis*. Side-plate 2 rectangular in outline, front and back margins nearly parallel, lower margin transverse, slightly convex and provided with a row of setules. Side-plate 3 extending slightly beyond the second joint of the peræopod, sides nearly parallel but slightly wider below, lower margin transverse, very slightly convex and bordered by a row of minute setules. Side-plate 4 with hind margin not so deeply excavated as in *B. catharinensis*, lower margin bordered by a row of minute setules. Side-plate 5, hind lobe deeper and more acute than in *B. catharinensis*. Side-plates 6 and 7 differing very slightly from those of *B. catharinensis*. Posterior lateral margin of abdominal segment 3 bearing a greater number of serrations than that of *B. catharinensis*. Uropods about as in *B. catharinensis*. Telson proportionately shorter and broader than in *B. catharinensis*, lobes with apices acute and inside margins concave, each lobe with two setules near the apex, and each side of telson bearing three setules near the base.

LENGTH.—♀ 6 mm.

Gammaridæ**Elasmopus** species

Station 5678. 24° 35' 20" N. 111° 59' 35" W. Magdalena Bay, western coast of Lower California, March 21, 1911, 13½ fathoms; 1 specimen.

A single female specimen was taken at this station. As the females of the genus *Elasmopus* show but poorly the specific characters and the species of this genus belonging to the west coast of America are but imperfectly known, a specific identification of this specimen would be of very doubtful value.

Aoridæ**BEMLOS**, new genus

Characters of this new genus are in general like those of *Lembos*. Gnathopod 1 in male has the fifth joint short and broad, and the sixth broader and three times longer than the fifth, palm transverse, short and toothed, finger overlapping palm. Inner plate of maxillipeds with three teeth on upper edge. Female as in *Lembos*.

Bemlos macromanus, new species

TYPE LOCALITY.—Lower California, no definite locality given; 13 specimens (1 ♂ type).

MALE.—Antenna 1 slender and nearly as long as the body, accessory flagellum composed of seven long and one short joint and reaches just beyond the sixth joint of the primary flagellum. Antenna 2 normal. Mandible with 9 spines in spine-row, molar with small accessory process, third joint of palp about one-third longer than second, and bearing many long bristles, and on the front edge also a comb of fine short bristles, second joint with bristles on front edge. Maxilla 1, inner plate with one plumose seta, outer plate normal, palp normal, but bearing an oblique row of slender bristles on outside. Maxilla 2 normal. Maxilliped, outer plate reaching a little beyond the middle of the second joint of palp and bearing eleven odontoid spines on inner edge, inner plate, upper end truncated and bearing three short teeth at inner corner, inner edge bearing a row of long plumose setæ. Lower lip with long, thin, pointed mandibular processes, inner lobes very large and tumid. Side-plates shallow, first produced very slightly forward. Gnathopod 1, second joint stout, excavated along the front margin, lower anterior corner produced to a point, fifth joint stout, broader than long and somewhat triangular, sixth joint very stout, three times as long and one-third broader than the fifth, widest through the middle, palm with a broad, stout, setose tooth in the middle, a strong, straight tooth continuous with the hind border of the joint defines the palm, the strong, curved finger overlaps the palm. Gnathopod 2 normal, with fifth joint slightly longer than sixth, sixth with palm oblique, slightly convex and very finely toothed throughout, finger fitting palm and having a row of small teeth and a few setæ on the inner edge, fifth and sixth joints provided with many long bristles. Peræopods 1 and 2 normal. Peræopods 3 and 4, side-plates with front half produced downward into a lobe, second joints slightly expanded, upper hind margin produced into an angular point, second joint of fourth peræopod bearing

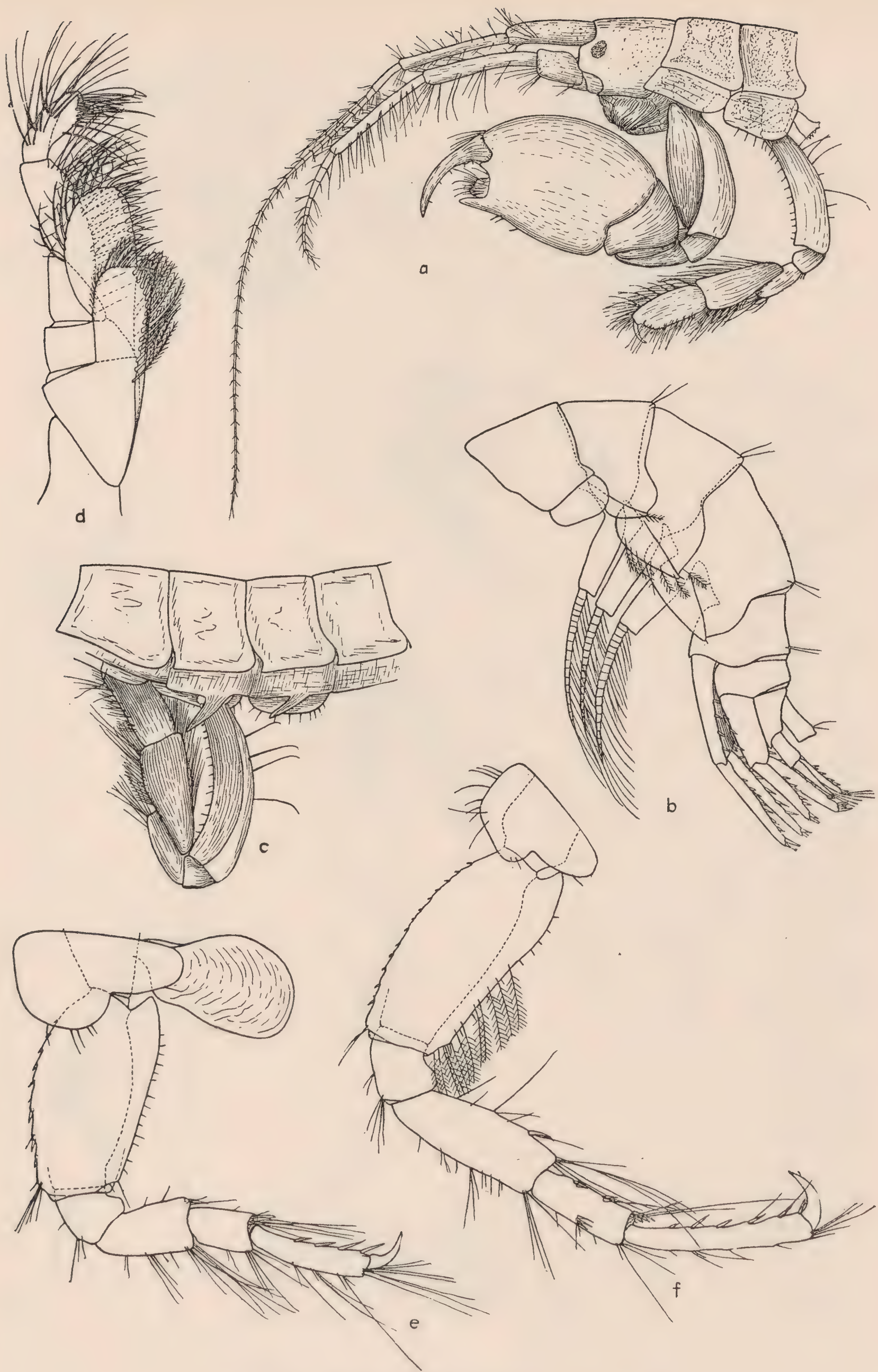


Fig. 10. *Bemlos macromanus*, new species

MALE.—*a*, head, first two thoracic segments, gnathopods and antennæ; *b*, abdomen, uropods and telson; *c*, conical appendages on the ventral surface of second and third thoracic segments; *d*, maxilliped; *e*, pereopod 3; *f*, pereopod 4.



Fig. 11. *Bemlos macromanus*, new species

MALE.—*a*, antenna 1 showing accessory flagellum; *b*, mandible; *c*, maxilla 1; *d*, maxilla 2; *e*, lower lip; *f*, telson.

FEMALE.—*g*, gnathopod 1; *h*, gnathopod 2.



Fig. 12. *Bemlos macromanus*, new species

MALE.—*a*, gnathopod 2 showing teeth of palm; *b*, peraeopod 1; *c*, peraeopod 2; *d*, peraeopod 5.
FEMALE.—*e*, peraeopod 5.



Fig. 13. *Bemlos macromanus*, new species

FEMALE.—*a*, gnathopod 1 showing palm and teeth of finger; *b*, gnathopod 2, showing fine teeth of palm and teeth of finger; *c*, pereopod 1; *d*, pereopod 2; *e*, pereopod 3; *f*, pereopod 4.

a few plumose setæ on hind margin. Peræopod 5 the longest, second joint little expanded, hind margin bearing many plumose setæ. The posterior lateral margins of the abdominal segments 1-3 are evenly convex and their lower posterior angles produced into minute points, lower margins slightly convex. Uropods about as in *Lembos*. Uropod 3 with outer ramus slightly shorter than inner. Telson very little longer than wide, narrow hind margin slightly excavate with each of the blunt lobes bearing a few setæ.

FEMALE.—Side-plates comparatively narrower and deeper than in male. Gnathopod 1 with second joint excavate on front margin, lower anterior corner produced into a point, fifth and sixth joints subequal in width, fifth a little over half the length of the sixth and triangular in general outline, sixth with edges slightly convex and narrowing slightly toward the distal end, palm convex, oblique and smooth, dactyl fitting palm and bearing a row of small teeth on the inner edge. Gnathopod 2 much as in the male, fifth and sixth joints subequal in length, palm less oblique and very finely toothed throughout, dactyl fitting palm and bearing a row of small teeth on the inner edge. Peræopods as in male; the second joints of peræopods 4 and 5, however, are more densely furnished with plumose setæ on their hind margins.

LENGTH.—♂ 9 mm., ♀ 10 mm.

The second and third thoracic segments of the male bear on the center of their ventral surfaces a forward-pointing, slightly conical process probably of the same nature as those which have been observed on several fresh-water amphipods by Sars, Smith, Haswell, Chilton, Tattersall and others. These processes, the function of which is not known, appear to have been very seldom observed in marine species.

HYPERIIDÆ

Vibiliidæ

Vibilia californica Holmes

Vibilia californica HOLMES, 1908, Proc. U. S. National Museum, XXXV, p. 490.

Guadalupe Island, Gulf of California, March 3, 1911, electric light; 1 specimen. Agua Verde Bay, Gulf of California, electric light; 1 specimen. Carmen Island, Gulf of California, electric light; 8 specimens.

This species was described by S. J. Holmes from two specimens dredged by the Steamer 'Albatross' off Point Loma, Southern California.

Hyperiidæ

Hyperia species

San Josef Island, Gulf of California, electric light; 1 specimen.

Carmen Island, Gulf of California, electric light; 2 specimens.

These specimens are all quite young, so that it is hardly possible to identify them specifically.

Phrosinidæ

Anchylomera blossevillii Milne-Edwards

Anchylomera blossevillii MILNE-EDWARDS, 1830, Ann. des Sci. Nat., XX, p. 394 (extr., p. 43).

Hieraconyx abbreviatus, ♂, GUERIN, 1836, Magasin de Zoologie, Classe VII, p. 5, Pl. XVII, figs. 2, 2a-2f.

Cheiropristis Messanensis, ♂, DE NATALE, 1850, Crost. del porto di Messina, tav. i, fig. 2.

Anchylomera purpurea, ♂, DANA, 1853, 'U. S. Explor. Exped.,' XIII, Pt. 2, p. 1001, Pl. LXVIII, figs. 9a-m.

Anchylomera thyropoda, ♀, DANA, 1853, 'U. S. Explor. Exped.,' XIII, Pt. 2, p. 1004, Pl. LXVIII, figs. 10a-g.

Anchylomera antipodes SPENCE BATE, 1862, 'Brit. Mus. Catal. Amph. Crust.,' p. 322, Pl. LI, figs. 9, 10.

Anchylomera Blossevillei SPENCE BATE, 1862, 'Brit. Mus. Catal. Amph. Crust.,' p. 323, Pl. LII, fig. 1.

Anchylomera Hunteri SPENCE BATE, 1862, 'Brit. Mus. Catal. Amph. Crust.,' p. 324, Pl. LII, fig. 2.

Anchylomera abbreviata SPENCE BATE, 1862, 'Brit. Mus. Catal. Amph. Crust.,' p. 324, Pl. LII, fig. 3.

Anchylomera purpurea SPENCE BATE, 1862, 'Brit. Mus. Catal. Amph. Crust.,' p. 325, Pl. LII, fig. 5.

Anchylomera thyropoda SPENCE BATE, 1862, 'Brit. Mus. Catal. Amph. Crust.,' p. 325, Pl. LII, fig. 6.

Anchylomera abbreviata BOVALLIUS, 1887, 'Arctic and Antarctic Hyperids, Vega-Exped.,' IV, p. 571.

Anchylomera antipodes BOVALLIUS, 1887, 'Arctic and Antarctic Hyperids, Vega-Exped.,' IV, p. 572.

Anchylomera blossevillii STEBBING, 1888, 'Challenger Amphipoda,' p. 1433, Pl. CLXXVII.

Anchylomera blossevillei CHEVREUX, 1900, 'Rés. Camp. Sci., Monaco,' Fasc. 16, p. 147.

Anchylomera blossevillii CHILTON, 1912, Trans. Roy. Soc. Edinburgh, XLVIII, Pt. 2 (No. 23), p. 516.

Cape San Lucas, Lower California, ship's anchorage, March 24, 1911, electric light; 2 specimens.

This species is very widely distributed, both in the Atlantic and Pacific Oceans, but the present record is the first for the western coast of North America.

Pronoidæ

Symprone anomala, new species

LOCALITIES.—Cape San Lucas, Lower California, ship's anchorage, electric light; 2 specimens. Cape San Lucas, Lower California; 1 specimen. Agua Verde Bay, Gulf of California, electric light; 6 specimens (1 ♂ type).

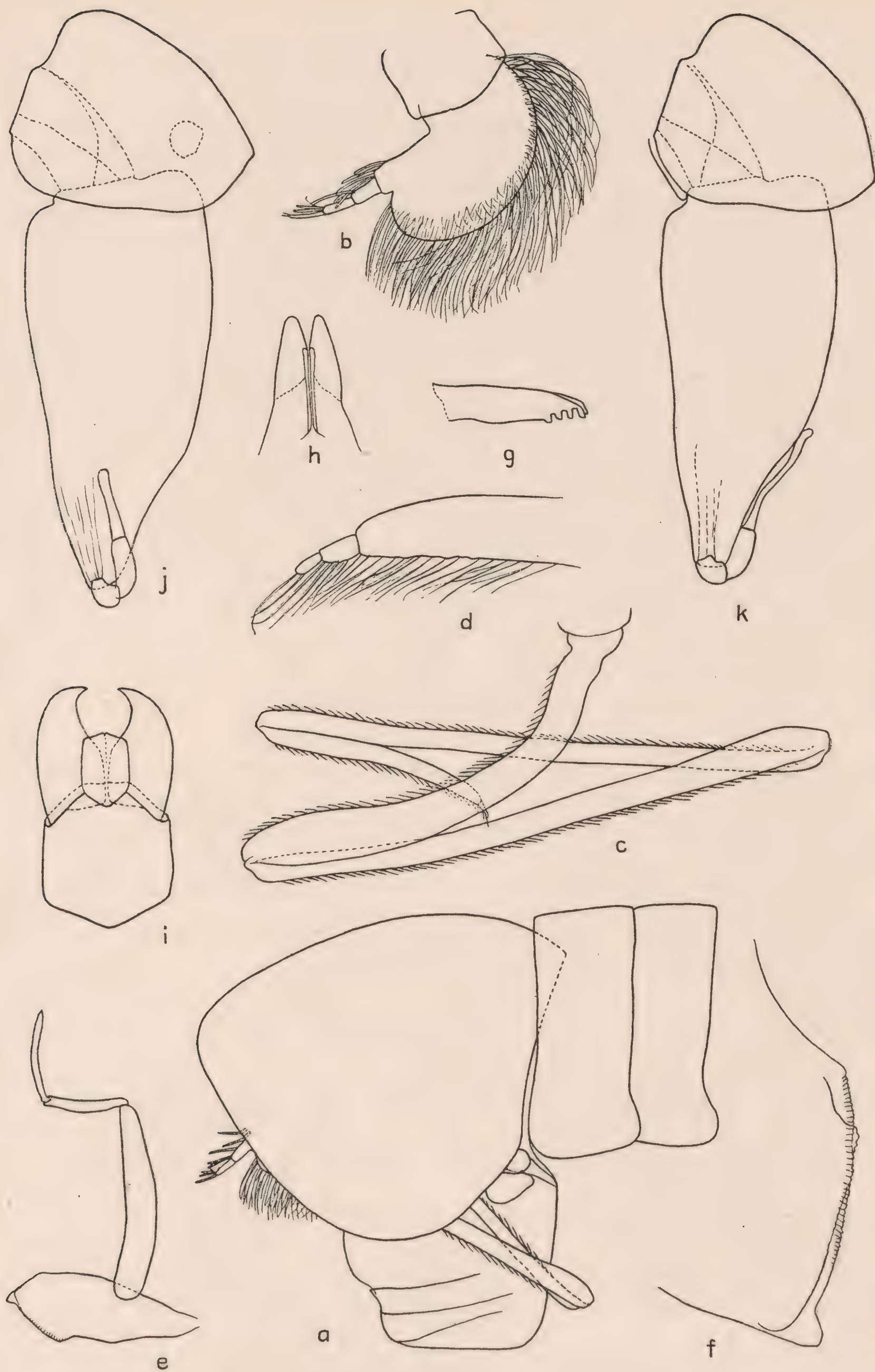


Fig. 14. *Symprone anomala*, new species

MALE.—*a*, head and first two thoracic segments; *b*, antenna 1; *c*, antenna 2; *d*, end of flagellum enlarged; *e*, mandible; *f*, cutting edge of mandible; *g*, maxilla 1; *h*, maxilla 2; *i*, maxillipeds; *j*, peraeopod 5; *k*, peraeopod 5 of another specimen.

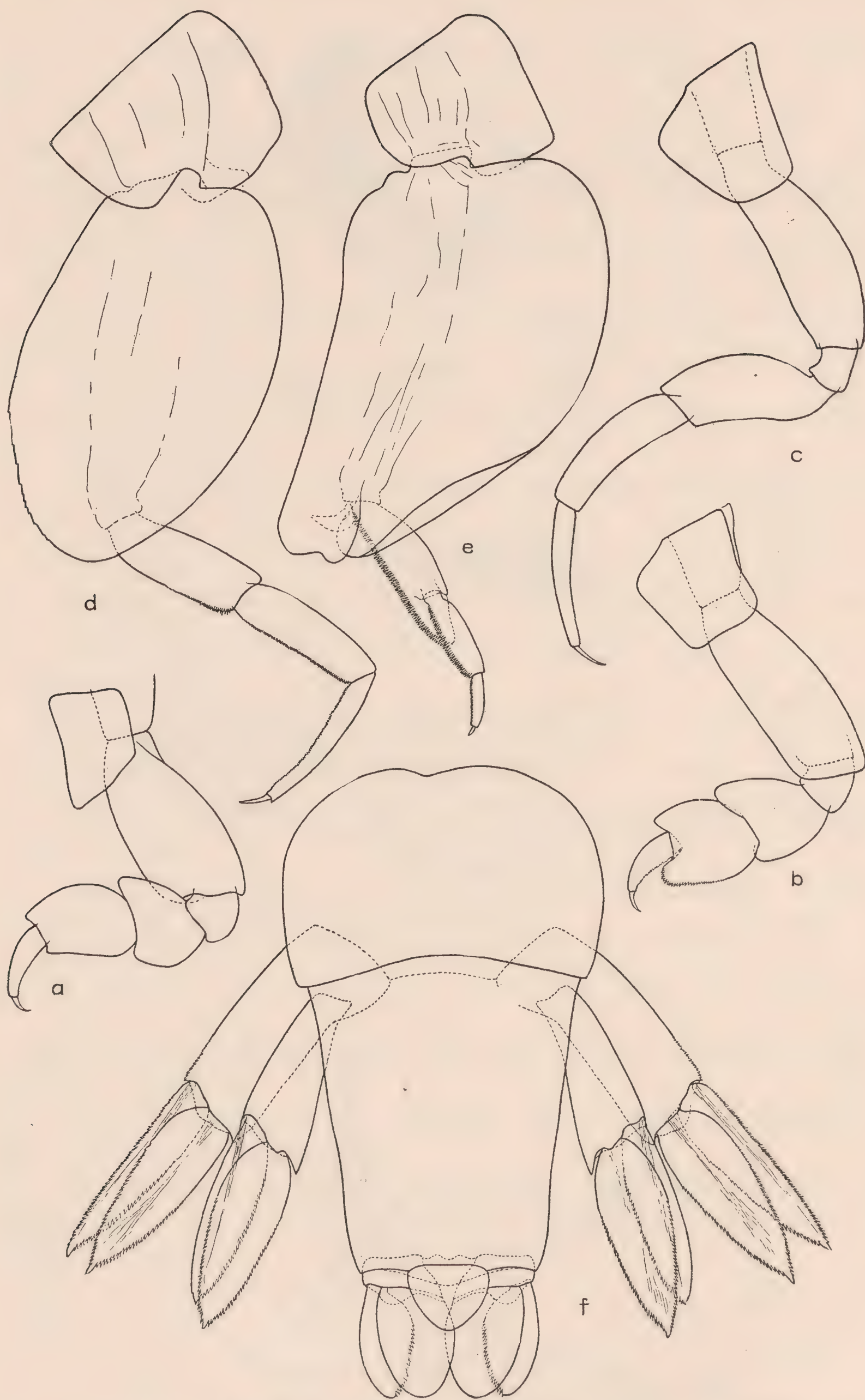


Fig. 15. *Symprone anomala*, new species

MALE.—*a*, gnathopod 1; *b*, gnathopod 2; *c*, peræopod 2; *d*, peræopod 3; *e*, peræopod 4; *f*, uropod and telson.

MALE.—These specimens agree very closely with *Symprone parva* (Claus) and *Symprone propinqua* Stebbing, but differ from both of these species in a few well-marked characters. The front angle of the head is a little more acute. Antenna 1, first joint of flagellum somewhat wider and produced into more of a lobe distally; second and third joints subequal in length, fourth joint very slender and a little longer than third. Antenna 2, fifth joint of peduncle a little shorter than fourth, first joint of flagellum over half the length of the third joint of peduncle and less than half the length of the fifth, second joint of flagellum very small, third joint of flagellum shorter and narrower than second. Maxillipeds much shorter proportionately than in *S. parva*. Other mouth-parts agreeing with those of *S. parva*. Gnathopod 1, joints shorter and broader proportionately than in either *S. parva* or *S. propinqua*. Gnathopod 2 with upper distal end of fifth joint somewhat produced. Peræopod 4 with second joint not distally rounded, but slightly emarginate. Peræopod 5 with second joint as in *S. parva*, but with three narrow terminal joints instead of two, the first of these joints short, the second longer and somewhat narrower, and the third narrower and longer than the second, this last joint varies in length being in some cases little longer than the preceding and in others nearly twice as long. Uropods and telson much as in *S. parva* except that the telson is obtusely pointed and is one-fourth wider than long.

LENGTH.—7 mm.

Brachyscelidæ Stephensen, 1923

Brachyscelus cruscum Spence Bate

Brachyscelus cruscum SPENCE BATE, 1861, Ann. and Mag. Nat. Hist., (3) VIII, p. 7, Pl. II, figs. 1, 2.

Brachyscelus cruscum SPENCE BATE, 1862, 'Brit. Mus. Catal. Amph. Crust.,' p. 333, Pl. LIII, figs. 2, 3.

Thamyris cruscum BOVALLIUS, 1887, 'Systematical List of Amph. Hyper.,' Bihang till K. Svensk. Vetensk.-Akad. Handl., XI, No. 16, p. 31.

Thamyris mediterranea CLAUS, 1887, 'Platysceliden,' p. 60, Pl. XVI, figs. 11-18.

Brachyscelus cruscum STEBBING, 1888, 'Challenger Amphipoda,' p. 1544, Pl. CXCv, specimen a.

Brachyscelus cruscum CHEVREUX, 1893, Bull. Soc. Zool. France, XVIII, pp. 70-74, text figs. 1-9.

Brachyscelus crustulum NORMAN, 1900, Ann. Mag. Nat. Hist., (7) V, p. 134.

Brachyscelus cruscum + *B. mediterraneus* CHEVREUX, 1900, 'Rés. Camp. Sci. Monaco,' Fasc. XVI, p. 153, 154.

Brachyscelus mediterraneus SENNA, 1903, Ann. Mus. Zool. Napoli, (N. Ser.) I, No. 6, p. 5.

Brachyscelus cruscum TATTERSALL, 1906, Fisheries, Ireland, Sci. Invest., 1905, No. 4, Pt. 8, p. 26.

Brachyscelus cruscum HOLMES, 1908, Proc. U. S. Nat. Mus., XXXV, p. 490.

Brachyscelus cruscum STEPHENSEN, 1923, 'The Danish Ingolf-Exped.,' III, 'Crust. Malacos.,' V (Amphipoda. 1), p. 37.

Cape San Lucas, Lower California, ship's anchorage, electric light; 5 specimens. Carmen Island, southeast side, Gulf of California, electric light; 1 specimen. San Josef Island, Gulf of California, electric light;

2 specimens. Agua Verde Bay, Gulf of California, electric light; 15 specimens.

This is a very widely distributed species and was reported off Point Loma, southern California, by S. J. Holmes in 1908.

Lycæidæ

Lycæa bajensis, new species

LOCALITIES.—San Josef Island, Gulf of California, electric light; 23 specimens (1 ♂ type). Cape San Lucas, Lower California, ship's anchorage, electric light; 4 specimens. Cape San Lucas, Lower California, ship's anchorage, electric light; March 24, 1911, 1 specimen. Carmen Island, southeast side, Gulf of California, electric light; 3 specimens.

MALE.—Head globular. Antenna 1, upper edge of first joint of flagellum nearly straight, there being a very shallow angle near the peduncle, the upper distal extremity of this joint forming nearly a right angle, second joint longer than third or fourth, which are subequal. Antenna 2 as in Stebbing's figure of *L. vincenti*, except that the fifth joint of the peduncle is very slightly shorter than fourth and the flagellum reaches very nearly to the end of the fifth joint. Maxillipeds as in *L. vincenti*. Mandibular palp with third joint slightly longer than second. Gnathopods 1 and 2 as in *L. vincenti*, but the lower distal angle of fifth joint not so sharply produced. Peræopod 2 as in *L. vincenti* except the rear edge of sixth joint is without minute teeth. Peræopod 3 much as in *L. vincenti*, but with the hind margin of second joint more convex. Peræopod 4, front margin of second joint having a decided hump in the middle. Peræopod 5, second joint, strikingly widest through the middle, hind margin not evenly convex, succeeding joints and dactyl as in *L. vincenti*. The posterior lateral corners of abdominal segments 1–3 evenly rounded. The rami of all the uropods are straight and their edges finely pectinate except the outer edge of the outer ramus of uropods 2 and 3. Telson with sides evenly convergent, except at the basal fourth, where they are constricted, and about parallel.

LENGTH.—7 mm.

FEMALE.—Thorax quite tumid, narrowing suddenly to the slender abdomen. Head not so long as in male, but just as deep. Antenna 1, first joint of flagellum not expanded, second joint short, third joint a little longer than second. Gnathopod 1, as in male, except there are no fine teeth on the fifth or sixth joints and the lower distal corner of the fifth joint is not so sharply produced. Gnathopod 2 as in male, but without the fine teeth on fifth or sixth joints. Peræopods as in male. Posterior lateral corners of abdominal segments 1–3 as in male. Uropods as in male. Telson with sides nearly straight and evenly convergent, not constricted at base.

LENGTH.—7 mm.

Parascelidæ

Parascelus zebu Stebbing

Parascelus zebu STEBBING, 1888, 'Challenger Amphipoda,' p. 1496, Pl. CLXXXV.

Carmen Island, southeast side, Gulf of California, electric light; 2 specimens.

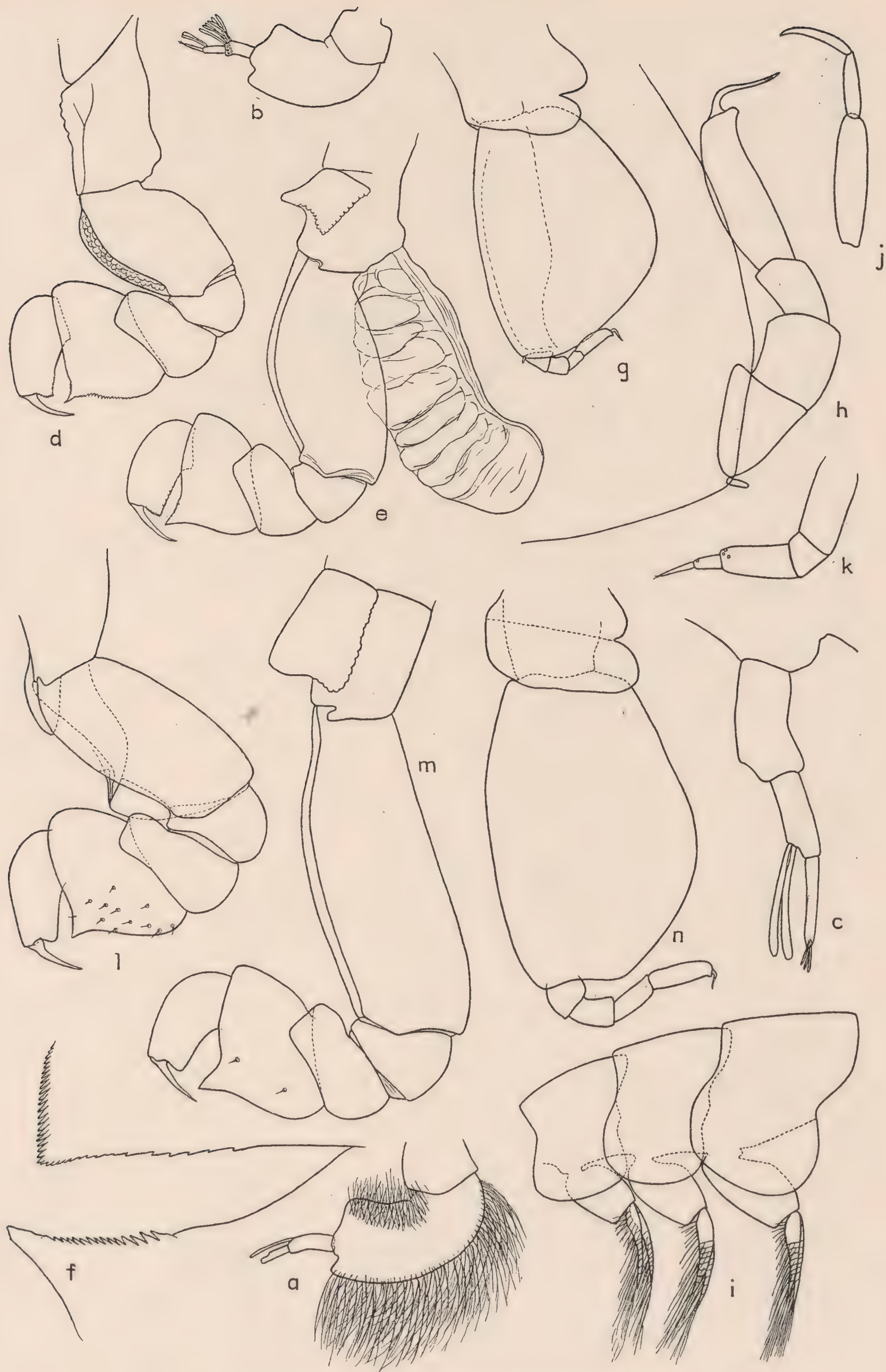


Fig. 16. *Lycæa bajensis*, new species

MALE.—*a*, antenna 1, fourth joint of flagellum missing; *b*, antenna 1 of another specimen showing fourth joint of flagellum; *c*, second, third, and fourth joints of flagellum enlarged; *d*, gnathopod 1; *e*, gnathopod 2; *f*, fifth and sixth joints of gnathopod 2 enlarged; *g*, peræopod 5; *h*, third, fourth, fifth, and sixth joints of peræopod 5 enlarged; *i*, abdominal segments 1-3; *j*, palp of mandible.

FEMALE.—*k*, antenna 1; *l*, gnathopod 1; *m*, gnathopod 2; *n*, peræopod 5.

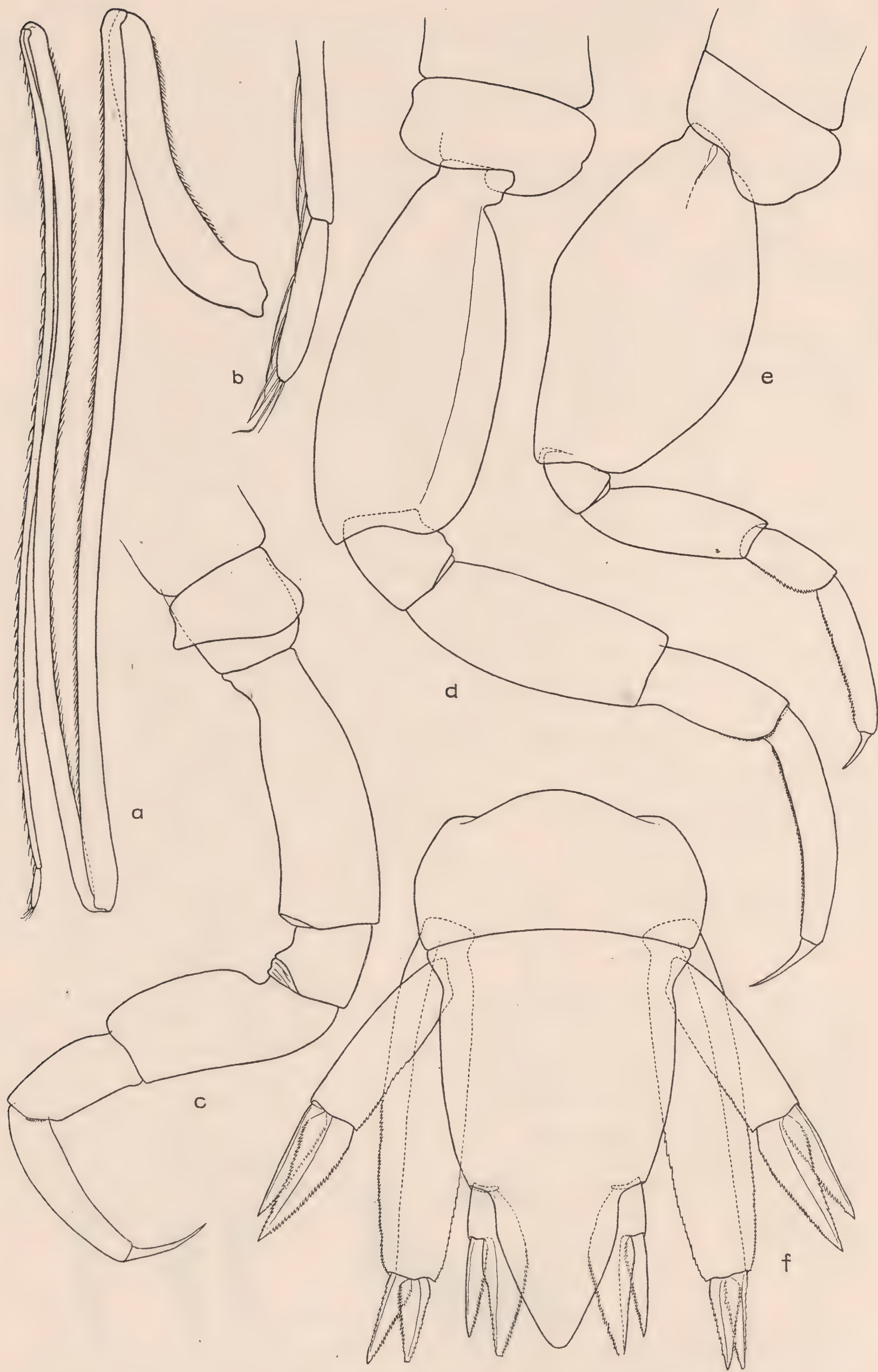


Fig. 17. *Lycæa bajensis*, new species

MALE.—*a*, antenna 2; *b*, end of flagellum of antenna 2 enlarged; *c*, pereopod 2; *d*, pereopod 3; *e*, pereopod 4; *f*, uropods and telson.



Fig. 18. *Parascelus zebu* Stebbing

MALE.—*a*, head; *b*, antenna 1; *c*, first, second, and third joints of flagellum enlarged; *d*, antenna 2; *e*, end of second joint of flagellum of antenna 2 enlarged; *f*, mandibles; *g*, maxilla 1; *h*, maxillæ 2; *i*, maxillipeds; *j*, gnathopod 1; *k*, gnathopod 2; *l*, peræopod 2; *m*, peræopod 3; *n*, peræopod 4; *o*, third, fourth, fifth, and sixth joints of peræopod 4 enlarged; *p*, peræopod 5; *q*, uropods and telson.

FEMALE.—*r*, gnathopod 1; *s*, gnathopod 2; *t*, peræopod 5; *u*, antenna 2; *v*, head from below.



Fig. 19. *Parascelus zebu* Stebbing

MALE.—*a*, gnathopod 1; *b*, gnathopod 2; *c*, peraeopod 5; *d*, uropod 1; *e*, uropod 2; *f*, uropod 3.
 FEMALE.—*g*, uropod 3; *h*, antenna 1; *i*, antenna 2; *j*, gnathopod 1; *k*, gnathopod 2; *l*, peraeopod 5.

These specimens, of which one is male and the other female, agree quite well with Stebbing's figures. The inner ramus of uropod 3 in the male is not pointed as in his figure, but is bluntly rounded; this, however, may be an individual peculiarity, as that of the female is much more like Stebbing's figure. Peræopod 5 of female with second joint not expanded as in male, and with the succeeding portion of the limb proportionately longer. Length of the specimens, 6 mm.

Platyscelidæ

I am here using the name Platyscelidæ, which was established by Bate in 1862. Stebbing points out that, the genus *Typhis* having been preoccupied, *Platyscelus* remains its earliest synonym. Then by right of priority the family must become Platyscelidæ from the earliest genus *Platyscelus*. The family is much more restricted now and does not include the *Pronoinæ* (Dana) as when established by Bate.

Platyscelus dubius, new species

LOCALITIES.—Cape San Lucas, Lower California, ship's anchorage, electric light; 19 specimens (1 ♂ type). Carmen Island, southeast side, Gulf of California, electric light; 2 specimens. San Josef Island, Gulf of California, electric light; 3 specimens. Agua Verde Bay, Gulf of California, electric light; 3 specimens.

MALE.—Head with a depression just above the rostrum. Rostrum prominent. Eyes arranged in four groups. Antenna 1, first joint of flagellum tumid with upper edge short, and lower distal angle rounded and produced, second joint twice as wide as third, but equalling it in length, fourth joint a little longer and a little narrower than third. Antenna 2, third joint nearly straight, fourth a little longer than fifth, first joint of flagellum a little less than half the length of the fifth peduncular joint, second joint of flagellum a little longer than first. Maxillipeds, outer plates short and broad with inner edges slightly concave. Mandible, cutting edge oblique and provided with two rows of small blunt teeth, first joint of palp nearly straight and longer than second, second curved and longer than third, third slightly curved. Gnathopod 1 shorter than 2, the produced lobe of the fifth joint serrated on both edges, sixth joint serrated on inner edge. Gnathopod 2, the produced lobe of the fifth joint serrated on both edges and extending a little beyond the sixth joint, sixth joint serrated on inner edge. Peræopods 1 and 2 normal, sixth joint with 2 small teeth just above the dactyl. Peræopod 3, lower edge of second joint evenly rounded; fourth, fifth and sixth joints very nearly equaling one another in length and all with very fine serrations on the front margin. Peræopod 4, second joint with low, blunt tooth near the proximal end of front margin, lower margin oblique and nearly straight, fourth joint widest at distal end and twice as long as fifth, both fourth and fifth with conspicuous serrations on front margin, sixth joint very short and curved. Peræopod 5 nearly as that figured by Claus for *Eutyphis ovoides*,¹ second joint curved, third joint reduced to a mere knob,

¹'Die Platysceliden,' Taf. I, fig. 9.

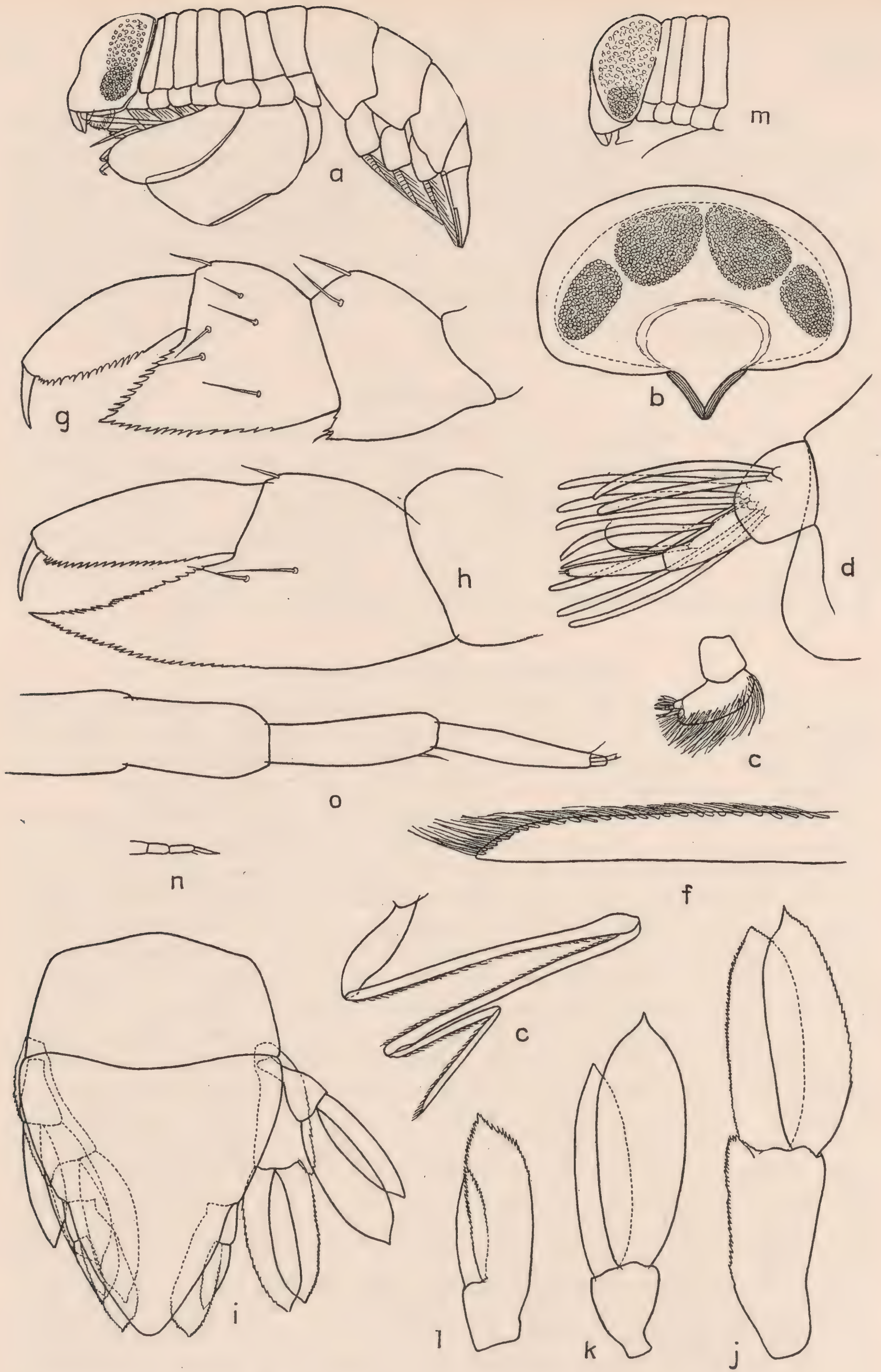


Fig. 20. *Platyscelus dubius*, new species

MALE.—*a*, entire animal; *b*, front of head; *c*, antenna 1; *d*, first, second, third, and fourth joints of flagellum of antenna 1 enlarged; *e*, antenna 2; *f*, end of flagellum of antenna 2 enlarged; *g*, gnathopod 1, *h*, gnathopod 2; *i*, uropods and telson; *j*, uropod 1; *k*, uropod 2; *l*, uropod 3.

FEMALE.—*m*, head; *n*, antenna 2; *o*, antenna 2 enlarged.

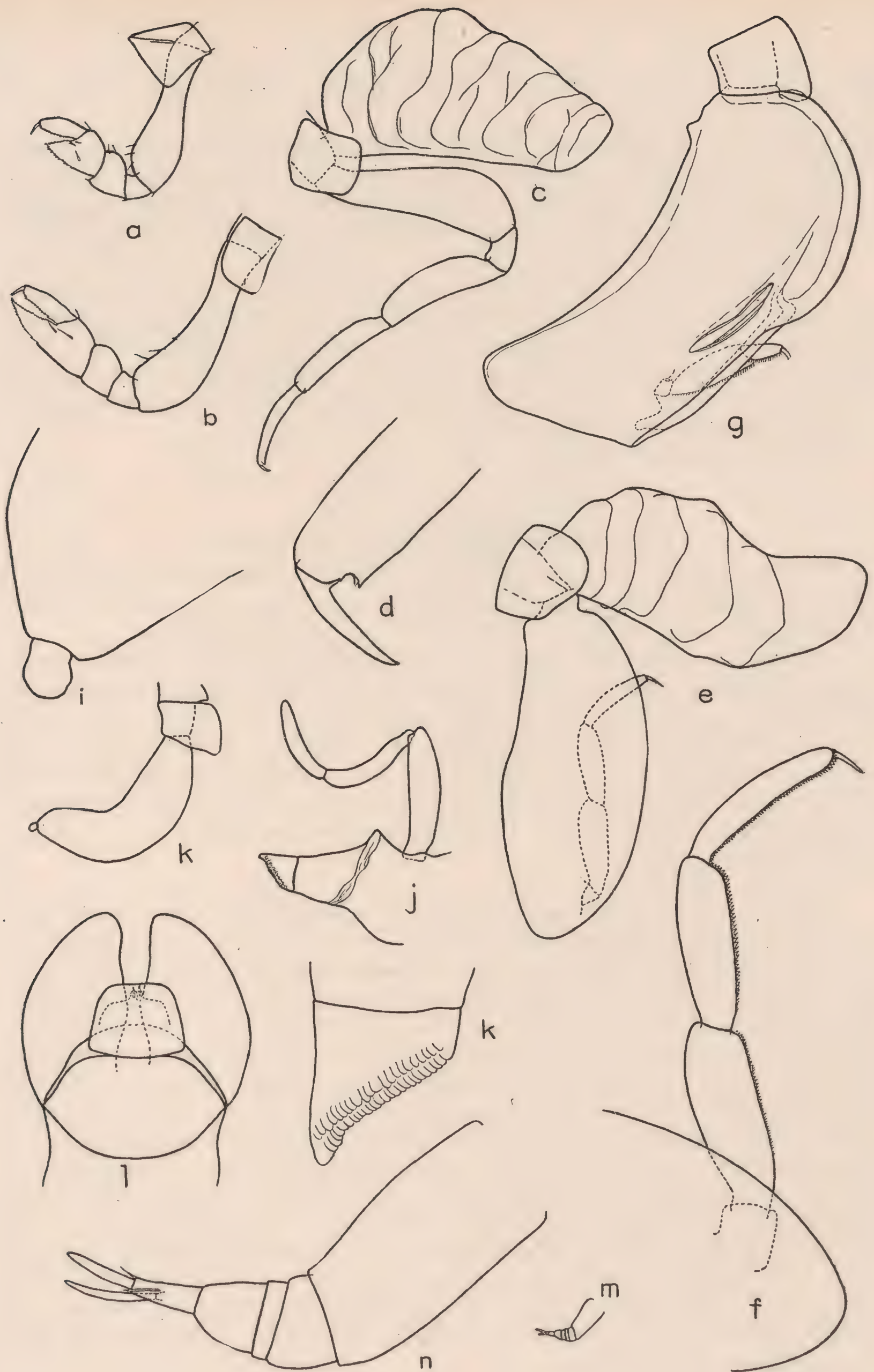


Fig. 21. *Platyscelus dubius*, new species

MALE.—*a*, gnathopod 1; *b*, gnathopod 2; *c*, peraeopod 2; *d*, end of sixth joint and dactyl of peraeopod 2 enlarged; *e*, peraeopod 3; *f*, third, fourth, fifth, and sixth joints of peraeopod 3 enlarged; *g*, peraeopod 4; *h*, peraeopod 5; *i*, end of second and small third joint or peraeopod 5 enlarged; *j*, mandible; *k*, cutting edge of mandible enlarged; *l*, maxillipeds.

FEMALE.—*m*, antenna 1; *n*, antenna 1 enlarged.

the rest of the limb suppressed. Uropod 1, outer margin of outer ramus, and inner margin of inner ramus finely serrate. Uropod 2, rami without serrations. Uropod 3, outer ramus with inner edge serrate, inner ramus with outer margin and upper part of inner margin serrate. Telson with edges nearly straight, slightly constricted at base.

LENGTH.—5.5 mm.

FEMALE.—Like the male generally but with the thorax much broader proportionately. Head with front perpendicular, and rostrum short and broad. Antenna 1, first joint about as long as all the rest combined, second joint twice as long as third, flagellum with three joints of about equal length but successively narrower. Antenna 2, fourth joint slightly shorter than fifth, fifth equal in length to the flagellum which consists of one joint with a few setules near the distal end.

LENGTH.—5 mm.

***Tetrathyrus sancti-josephi*, new species**

LOCALITIES.—San Josef Island, Gulf of California, electric light; 1 specimen (1 ♂ type). Agua Verde Bay, Gulf of California, electric light; 1 specimen. Carmen Island, southeast side, Gulf of California, electric light; 25 specimens.

MALE.—In general this species closely resembles *Tetrathyrus moncoeuri* Stebbing; but in a few characters it differs from that species. In the second antenna the fifth joint extends only to the smallest degree beyond the fourth. Peræopod 5 consists of only the first and second joints; the second joint is curved, about three times as long as wide, and terminates in a small knob. Uropods agreeing very closely with those of *T. moncoeuri* except that no division can be observed between the inner ramus and peduncle of uropod 2, thus forming a coalition as in uropod 3. Telson without terminal spinules.

LENGTH.—4 mm.

FEMALE.—Front of head perpendicular, not sloping at all forward as in the male. Antenna 1, flagellum equal in length to the peduncular joint, first joint of flagellum very short, second joint about three times as long as first and bearing a group of four setæ about the middle of the upper edge and one at the distal end, third joint about two-thirds as long as second and bearing two short spinules about the middle of the upper edge, one on the under edge near the distal end and one at distal end of upper edge, fourth joint a very little more than one-half the length of the third and bearing one or two minute spinules at the distal end. Gnathopods very closely resembling those of male; the lower distal angle of the sixth joint is not so much produced but is rather blunt and bears a single spinule. Peræopods 1–3 as in male. Peræopod 4 with second joint proportionately broader and the rest of the limb proportionately shorter than in male. Peræopod 5, second joint proportionately much narrower than in male and tapering off distally into an acute point. In one female examined the second joint of this peræopod ended less acutely and appeared to have a very minute third joint or an enlarged terminal spine as shown in the figure. Telson and uropods as in male except the rami end in more acute angles. Uropod 2 as in male has the inner ramus united with the peduncle.

LENGTH.—4.5 mm.



Fig. 22. *Tetrathyrus sancti-josephi*, new species

MALE.—*a*, head and antennæ; *b*, end of flagellum of antenna 2; *c*, antenna 1; *d*, gnathopod 1; *e*, gnathopod 1 enlarged; *f*, gnathopod 2; *g*, gnathopod 2 enlarged; *h*, pereopod 1; *i*, pereopod 3; *j*, pereopod 4; *k*, third, fourth, fifth, and sixth joints of pereopod 4 enlarged; *l*, pereopod 5; *m*, pereopod 5 enlarged; *n*, uropods and telson; *o*, uropod 1; *p*, uropod 2; *q*, uropod 3.

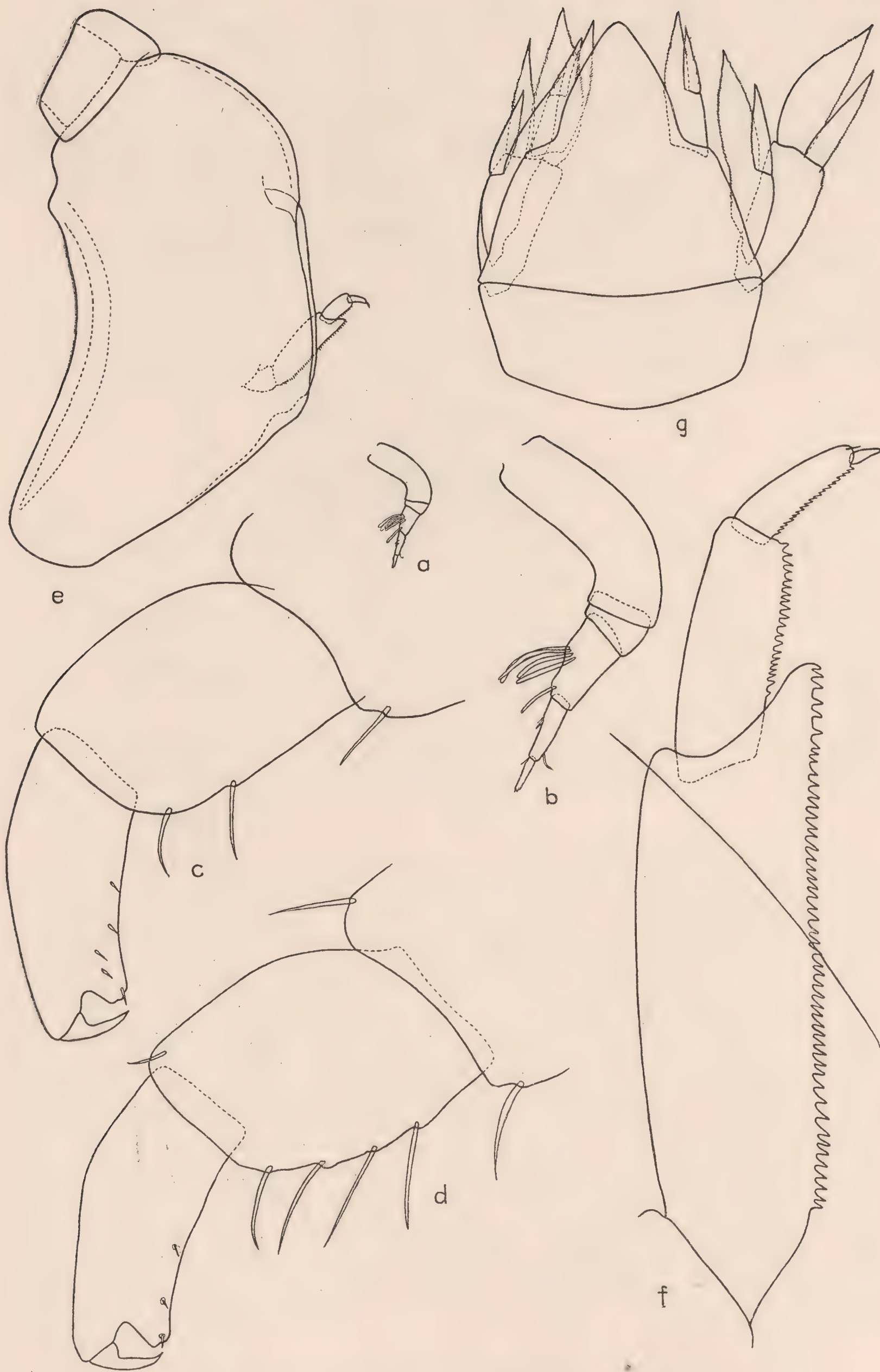


Fig. 23. *Tetrathyrus sancti-josephi*, new species

FEMALE.—*a*, antenna 1; *b*, antenna 1 enlarged; *c*, gnathopod 1; *d*, gnathopod 2; *e*, peraeopod 4; *f*, fourth, fifth, and sixth joints of peraeopod 4 enlarged; *g*, uropods and telson.



Fig. 24. *Tetrathyrus sancti-josephi*, new species

FEMALE.—*a*, gnathopod 1; *b*, gnathopod 2; *c*, peræopod 2; *d*, peræopod 3; *e*, sixth joint of peræopod 3 enlarged; *f*, peræopod 5; *g*, end of peræopod 5 enlarged; *h-i*, peræopod 5 of another specimen showing small third joint or an enlarged spine. *j-o*, peræopod 5 of other specimens showing variation in end of second joint.

Amphithyrus orientalis Stebbing

Amphithyrus orientalis STEBBING, 1888, 'Challenger Amphipoda,' p. 1485.

San Josef Island, Gulf of California; 2 specimens.

These specimens agree quite closely with Stebbing's description of this species in the 'Challenger Amphipoda.' He says, however, that the telson forms in outline an inverted arch with apex acute, but in the present specimens the apex is narrowly rounded as I have shown in the figure.

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Fig. 25. *Amphithyrus orientalis* Stebbing

MALE.—*a*, head; *b*, antenna 1; *c*, antenna 1 enlarged; *d*, flagellum of antenna 1 enlarged; *e*, antenna 2; *f*, end of flagellum of antenna 2 enlarged; *g*, mandible; *h*, cutting edge of mandible; *i*, maxilla 1; *j*, maxillipeds; *k*, uropod 1; *l*, uropod 2; *m*, uropod 3; *n*, uropod 3 enlarged.

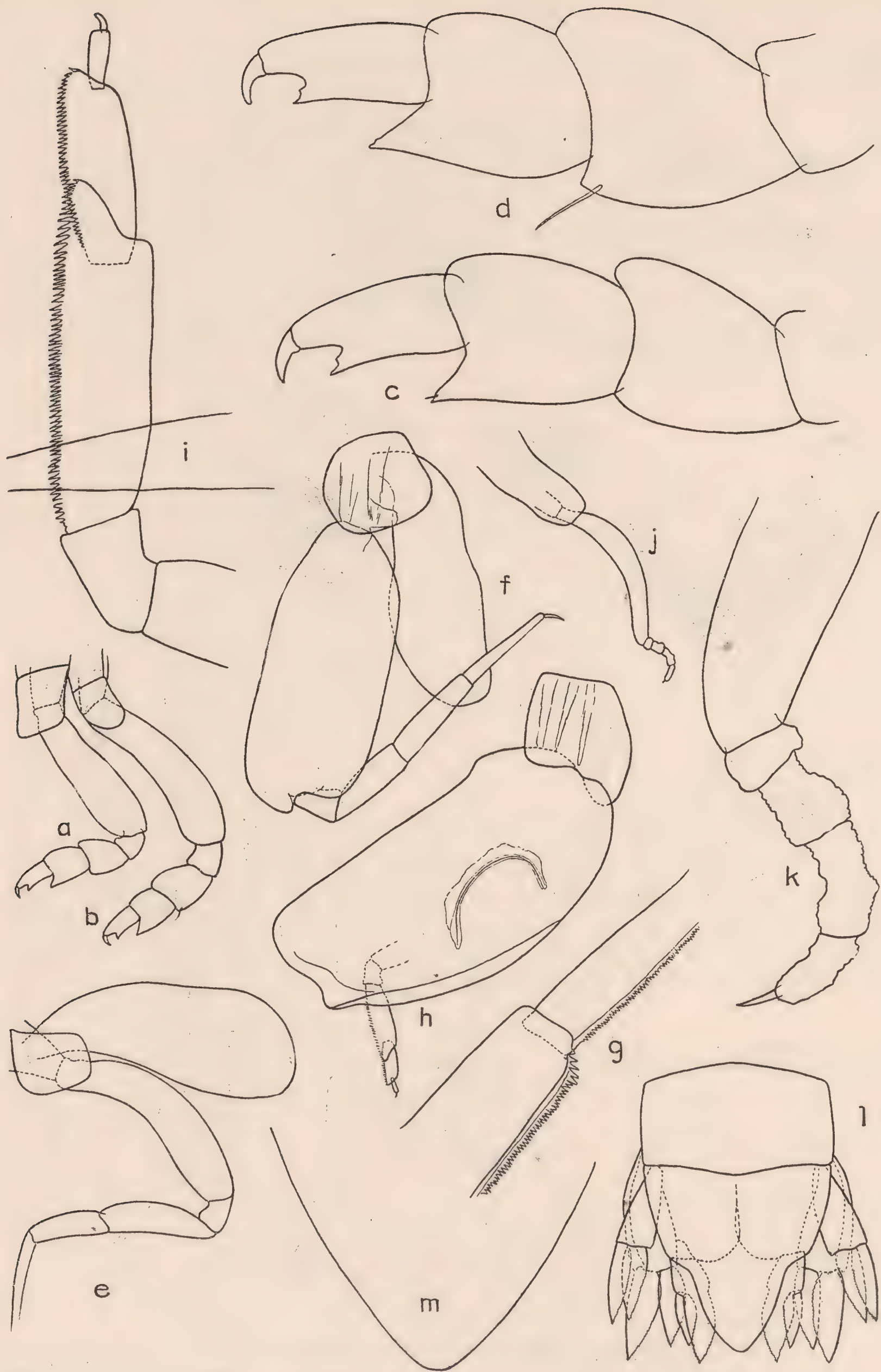


Fig. 26. *Amphithyrus orientalis* Stebbing

MALE.—*a*, gnathopod 1; *b*, gnathopod 2; *c*, gnathopod 1 enlarged; *d*, gnathopod 2 enlarged; *e*, peræopod 2; *f*, peræopod 3; *g*, fifth and sixth joints of peræopod 3 enlarged; *h*, peræopod 4; *i*, third, fourth, fifth, and sixth joints of peræopod 4 enlarged; *j*, peræopod 5; *k*, third, fourth, fifth, and sixth joints of peræopod 5 enlarged; *l*, uropods and telson; *m*, apex of telson enlarged.

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Article III.—THE GULLS (LARIDÆ) OF THE WORLD; THEIR PLUMAGES, MOULTS, VARIATIONS, RELATIONSHIPS AND DISTRIBUTION

BY JONATHAN DWIGHT, M.D.

PLATES V TO XV,
FIGURES 1-384

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INTRODUCTION

In spite of the extensive literature bearing upon this large and interesting group of birds, many of them in life being familiar objects of ocean, lake, and river shores, there appears to be room for the present contribution which is the outcome of original observations of wide scope based upon the study of museum specimens. Every known species of gull has been examined at first hand and often in very large series so that it is possible to discuss problems of plumage and relationship from new angles. Particular stress is laid upon the development of plumages through a succession of definite moults, each one of which advances the

young bird a step nearer the adult, and each plumage of each species is so described that comparison of the plumages of different species at like ages can be made. A feature, never before attempted on so large a scale, is the illustration by diagram of the pattern of the wings and tails of every species in every plumage, and colored plates which illustrate the colors in life of the bills and other soft or fleshy parts of many North American species have also been prepared for me.

Other authors have been drawn upon only when it was impossible to obtain the desired information at first hand through independent and critical examination of a wealth of material that I have been privileged to study at home and abroad during a period covering several years. I have had opportunity to examine many of the largest and most important collections of birds in the world, and I have brought together and made direct comparison and measurements of unusually large numbers of specimens. Besides the birds in my own collection, I have utilized those in many others that have been kindly placed at my disposal and I scarcely know where to begin in making acknowledgments for the courtesies shown me first and last. I am indebted primarily to Dr. F. M. Chapman and his assistants for unrestricted access to the large collections in The American Museum of Natural History; to Dr. L. C. Sanford for use of his rare series, also in the American Museum; to Dr. C. W. Richmond of the U. S. National Museum for opportunity to examine the large collection in that museum; to Mr. O. Bangs of the Museum of Comparative Zoölogy; to Mr. P. A. Taverner of the Victoria Memorial Museum; to Mr. W. E. C. Todd of the Carnegie Museum; to Dr. W. E. Osgood of the Field Museum; and to Mr. C. H. Rogers of the Princeton Museum of Zoölogy for like favors. The fine private collection, particularly rich in gulls, of Dr. L. B. Bishop of New Haven, and that of Mr. J. H. Fleming of Toronto, and of Mr. C. F. Batchelder of Cambridge have been of great service to me and thanks are also due Dr. L. E. Wyman, Dr. C. W. Townsend, and Messrs. D. R. Dickey, A. C. Bent, and F. S. Hersey for the loan of interesting material. Furthermore it has been my privilege to spend part of a summer working on the extensive and unrivalled material in the British Museum (Natural History, South Kensington), thanks to the courtesy of Dr. P. R. Lowe and his staff, and of Mr. W. L. Sclater, and my thanks are also extended to Lord Rothschild and Dr. E. Hartert for opportunity to study the gulls in the Tring Zoölogical Museum and to Mr. H. F. Witherby of London for a chance to examine his interesting series.

TAXONOMY AND NOMENCLATURE

Taxonomy, the art of classifying, and nomenclature, the art of naming, go hand-in-hand, but they are not sciences as many people suppose. Theoretically, at least, taxonomy is based upon phylogenetic affinities or relationships, while practically it becomes largely a matter of personal opinion or judgment because it rests upon the importance attached to certain characters about the value of which in many cases there is bound to be disagreement. Nomenclature is still more a matter of opinion although there can be no question that names as short-cuts in expressing facts are most essential conveniences.

It is of prime importance that the gulls should be recognizable by name before we can discuss them intelligently. My endeavor has been to be conservative in adopting names that can be consistently applied according to nomenclatural standards, for the "Laridists" (as Coues, 1862, has called them) have not treated the gulls kindly, as evinced by the various classifications and the multitude of synonyms that clutter the pages of literature. Nothing is to be gained by thrashing over all of this straw but the difficulty is to separate the wheat from the chaff, for what has already been done by others cannot be ignored. Many of the old records and opinions cannot be verified without specimens which are now non-existent and I have therefore been obliged to accept a good deal that may be wrong without being able to prove it one way or the other.

While the gulls may be arranged in several ways according to the value attached to certain variable characters, it is a question (if not a guess) which of them are the more primitive. The species always darkest in color of plumage, bill, feet, and eye would seem perhaps to have the best claim to this distinction because they resemble in darkness and lack of pattern at all stages the young of many species that later develop both specialized colors and patterns. Be this as it may, the wings and tail of some species remain very much the same in both young and old, and from such a simpler group the others are perhaps derived.

It seems to me that any grouping of the gulls should show the maximum of convenience consonant with the known facts. As regards their position in the higher groups, it is the modern conclusion that they belong to the Order Charadriiformes, which is divided into three suborders, Alcæ, Lari, and Limicolæ, the Lari being further divided into four families, Stercorariidæ, Laridæ, Sternidæ, and Rhynchopidæ. Without entering into a discussion as to whether this arrangement or one of the others that has been proposed is the most accurate, I am ready to accept the Laridæ as a family, because this is a most convenient grouping of the

gulls and consonant with the facts. The claim for family rank is debatable and many think they should at all events be classed with their nearest relatives, the terns, which have been placed in a separate family, the Sternidæ; but, as a matter of fact, no species of gull more than approximates the pointed, generally slender bill and deeply forked tail of the terns, to cite only two of the prominent differential characters. Accepting, then, the Laridæ as a family, there are some forty or more species in a remarkably homogeneous group that does not lend itself readily to subdivision. If on the one hand every minor difference or slight single character be recognized, as some authorities have advocated, then a multiplicity of monotypic genera hardly differing, if at all, from species will result and the value of such genera as taxonomic units will be completely nullified. If, on the other hand, ponderable differences are grouped in larger units, many slightly dissimilar species must be included in one genus.

Before going further it may be well to consider briefly the gradual growth in knowledge of the gulls and the nomenclatural views of a few of the more prominent early writers on natural history. The earliest, recognized as a rule very few species of gulls, although Ray (1713) described eighteen ("Lari tridactyli" and "Lari tetradactyli") besides ten species of terns. Ray and the other pre-Linnæan writers, however, were not binomial and their works are useful only in throwing some light upon the question as to what species were known, and only later (at and after 1858) were these species furnished with binomial names that are nomenclaturally valid. Linnæus (1758) recognized three genera, *Larus*, *Sterna*, and *Rynchops*, his *Larus* containing six species, *tridactylus*, *canus*, *marinus*, *fuscus*, *atricilla*, and *parasiticus*, the last now relegated to the family Stercorariidæ, the others accepted today as valid species and even their names retained. After Linnæus came Brisson (1760), non-binomial and therefore useful only to identify by good, but often inadequate, descriptions, the fifteen species of "Genus Lari" that had already received or were later given names by other writers. Linnæus, in the 1761 edition of 'Fauna Suecica' gives the same five species (two more than in the 1746 edition) of *Larus* described in his 'Systema' of 1758. The next author whose names for gulls must be taken into account is Pontoppidan (1763). It seems to me, after a personal examination of the 'Danske Atlas,' having passages from it read to me by a Dane, that Pontoppidan is likely to be discarded as being a non-binomial author, although today his names are accepted, *argentatus* being the only one of the gulls that now rests on his authority. Brünnich (1764) lists

fourteen species of gulls, but several are unidentifiable and no new names are applicable. Linnæus (1766) expands his 1758 list to eleven, *Rissa*, *cinerarius*, *nævius*, *ridibundus* and *catarractes* being the five species added. In 1780 Fabricius described six species of gulls, none of them new, and in 1789 Gmelin expanded Linnæus's list to twenty. Bonnaterre (1791) described seventeen to which Vieillot (in the continuation of Bonnaterre) added seven in 1820, and from this time on through the nineteenth century other species were gradually discovered and given names.

Up to the year 1819, when *Xema* was established, the gulls were in one genus (*Larus*); next *Gavia* was recognized; then *Rissa*; and by the middle of the century "genus-splitting" became a favorite pastime resulting in a flood of synonyms. The following list shows the genera in chronological order as proposed and the equivalents as recognized in the present paper.

List of Genera of Gulls Proposed Since 1758

Larus Linnæus, 1758, 'Syst. Nat.,' 10th Ed., I, p. 136 = *Larus*.

Xema Leach, 1819, in Ross's 'Voy. Baffin's Bay,' App. II, p. lvii = *Xema*.

Gavia Boie, 1822, Isis, p. 563 = *Pagophila*.

Rissa Stephens, 1826, Stephens, Shaw's 'General Zoölogy,' XIII, p. 180 = *Rissa*.

Pagophila Kaup, 1829, 'Skizz. Entw.-Gesch. u. Natürl. Syst. Europ. Thierw.,' p. 69 = *Pagophila*.

Hydrocolæus Kaup, 1829, 'Skizz. Entw.-Gesch. u. Natürl. Syst. Europ. Thierw.,' p. 113 = *Hydrocolæus*.

Cheimonea Kaup, 1829, 'Skizz. Entw.-Gesch. u. Natürl. Syst. Europ. Thierw.,' pp. 84, 196 = *Rissa*.

Ichthyaëtus Kaup, 1829, 'Skizz. Entw.-Gesch. u. Natürl. Syst. Europ. Thierw.,' p. 102 = *Larus*.

Lencus Kaup, 1829, 'Skizz. Entw.-Gesch. u. Natürl. Syst. Europ. Thierw.,' p. 86 = *Larus*.

Laroides Brehm, 1830, Isis, p. 993 = *Larus*.

Chroicocephalus Eyton, 1836, 'Hist. Rarer British Birds,' p. 58 = *Hydrocolæus*.

Rossia Bonaparte, 1838, 'Geographical and Comparative List,' p. 62 = *Rhodostethia*.

Rhodostethia Macgillivray, 1842, 'Manual British Ornith.,' II, p. 252 = *Rhodostethia*.

Cetosparactes Macgillivray, 1842, 'Manual British Ornith.,' II p. 251 = *Pagophila*.

Leucus Gray, 1842, 'Appendix, List of Genera of Birds,' p. 15 = *Larus*.

Plautus Reichenbach, 1852, 'Avium Syst. Nat., Longipennes,' p. 2 = *Larus*.

Polo-candora Reichenbach, 1852, 'Nat. Syst. Vögel,' (1853), p. v = *Rissa*.

Glaucus Bruch, 1853, Journ. für Ornith., p. 101 = *Larus*.

Dominicanus Bruch, 1853, Journ. für Ornith., p. 100 = *Larus*.

Blasipus Bruch, 1853, Journ. für Ornith., p. 108 = *Larus*.

Adelarus Bruch, 1853, Journ. für Ornith., p. 106 = *Larus*.

Gabianus Bruch, 1853, Journ. für Ornith., p. 100 = *Gabianus*.

- Leucophæus* Bruch, 1853, Journ. für Ornith., p. 108 = *Leucophæus*.
Procellarus Bonaparte, 1854, Naumannia, p. 211 = *Leucophæus*.
Epitelarus Bonaparte, 1854, Naumannia, p. 211 = *Leucophæus*.
Atricilla Bonaparte, 1854, Naumannia, p. 212 = *Hydrocolæus*.
Cirrhocephala Bonaparte, 1854, Naumannia, p. 213 = *Hydrocolæus*.
Gelastes Bonaparte, 1854, Naumannia, p. 212 = *Hydrocolæus*.
Melagavia Bonaparte, 1854, Naumannia, p. 212 = *Hydrocolæus*.
Gavina Bonaparte, 1854, Naumannia, p. 212 = *Larus*.
Creagrus Bonaparte, 1854, Naumannia, p. 213 = *Creagrus*.
Bruchigavia Bonaparte, 1857, 'Conspectus Avium,' II, p. 228 = *Hydrocolæus*.
Clupeilarus Bonaparte, 1857, 'Conspectus Avium,' II, p. 220 = *Larus*.
Lambruschina Salvadori, 1864, 'Cat. Uccelli Sardegna,' p. 128 = *Hydrocolæus*.
Einalia Heine and Reichenow, 1890, 'Nomenclator Musei Heineani Orn.,' p. 359 = *Larus*.
Epitelolarus Heine and Reichenow, 1890, 'Nomenclator Musei Heineani Orn.,' p. 359 = *Larus*.
Adelolarus Heine and Reichenow, 1890, 'Nomenclator Musei Heineani Orn.,' p. 358 = *Larus*.
Melanolarus Heine and Reichenow, 1890, 'Nomenclator Musei Heineani Orn.,' p. 359 = *Hydrocolæus*.

The following arrangements of the family Laridæ and its subdivisions based of necessity upon external characters is not the last word on the systematic position of gulls, but it at least shows them in what seems to be their possible relationships to one another so far as available material indicates.

Generic and subgeneric diagnoses follow: specific and subspecific diagnoses will be found under the respective species.

LARIDÆ	Lareæ	I. <i>Gabianus</i>			<i>fuliginosus</i>
		II. <i>Leucophæus</i>			<i>modestus</i>
		III. <i>Pagophila</i>			<i>heermanni</i>
			1. <i>Adelarus</i>		<i>leucophthalmus</i>
					<i>hemprichi</i>
	Xemeæ				<i>belcheri</i>
					<i>crassirostris</i>
		IV. <i>Larus</i>			<i>audouini</i>
					<i>delawarensis</i>
					<i>canus</i>
					<i>argentatus</i>
					<i>californicus</i>
					<i>cachinnans</i>
			2. <i>Larus</i>		<i>fuscus</i>
					<i>occidentalis</i>
					<i>dominicanus</i>
					<i>schistisagus</i>
					<i>marinus</i>
					<i>glaucescens</i>
					<i>hyperboreus</i>
					<i>leucopterus</i>
			3. <i>Ichthyaëtus</i>		<i>ichthyaëtus</i>
			4. <i>Atricilla</i>		<i>atricilla</i>
					<i>brunneicephalus</i>
			5. <i>Cirrhocephala</i>		<i>cirrhocephalus</i>
					<i>serranus</i>
					<i>novæ-hollandiæ</i>
		V. <i>Hydrocolæus</i>			<i>melanocephalus</i>
					<i>pipixcan</i>
					<i>bulleri</i>
			6. <i>Hydrocolæus</i>		<i>maculipennis</i>
					<i>ridibundus</i>
		VI. <i>Rhodostethia</i>			<i>genëi</i>
		VII. <i>Rissa</i>			<i>philadelphia</i>
		VIII. <i>Creagrus</i>			<i>minutus</i>
		IX. <i>Xema</i>	7. <i>Saundersia</i>		<i>saundersi</i>

LARIDÆ

SIZE large to small (wing 240–500 mm.).

BILL (Pls. V to VIII) short, stout and compressed varying to long and slender, shorter than tarsus (about equal to it in *Larus leucophthalmus* and *Rissa*); culmen decurved, the tip overhanging the mandible; gonys usually curved, seldom straight, angle at gonys or symphysis, prominent (less so in small species); nostrils, lateral, horizontal, near middle of maxilla, guttate or tear-shaped to linear-oval (ovate in *Gabianus*), the inner end pointed; frontal feathering forms angle on sides of maxilla and advances farther than on base of culmen.

TARSUS shorter than tail (except *Rissa*), longer than middle toe without claw (except *Rissa*), compressed and, together with toes, transversely scutellate, both tarsus and toes laterally reticulate; anterior toes webbed, hind toe small (in *Rissa* rudimentary, often without claw), middle toe longest, outer usually shorter, inner much shorter.

TAIL even or slightly rounded (emarginate in *Rissa*, forked in *Creagrus* and *Xema*, and cuneate in *Rhodostethia*), longer than tarsus (except *Rissa*); rectrices twelve.

WINGS long and pointed with primaries relatively shorter and broader and the secondaries relatively longer than in the Sternidæ; diastataxic, primaries eleven (the distal one a remicle), the tenth longest or about equal to the ninth.

There have been so many diagnoses of the Laridæ that I have endeavored only to give the salient characters of the true gulls as distinct from the terns, skimmers, skuas or jægers.

It seems to me that the separation of the gulls as proposed by Bruch (1853) and Bonaparte (1854) into two sections, the hooded (*Xemeæ*) and the non-hooded (*Lareæ*), is a useful distinction because there are other equally important characters correlated with the presence or absence of the hood. The characters, however, overlap and a few of the species might be placed in either section according to the value placed upon certain other peculiarities. For example, *ichthyaetus* has the hood and wing-pattern of a hooded gull, and a juvenal banded tail, but it has the size and large bill of the non-hooded gulls. So, too, *atricilla*, *fuliginosus* and *leucophthalmus* with wholly black primaries and hoods are possessed of characters belonging to both sections, while *novæ-hollandiæ*, *bulleri*, *genëi*, *Rissa*, and perhaps *Rhodostethia*, seem to be hooded gulls in most respects but lack the hood. Some of the other species also suggest one section almost as much as the other so that under the circumstances the two groups do not seem to merit subfamily rank but rather that of convenient sections which may be diagnosed as follows.

Lareæ

GENERA: *Gabianus*, *Leucophæus*, *Pagophila* and *Larus*.

SIZE large to medium (wing seldom less than 350 mm.). Body stout.

BILL (Pls. V, part, VI, VII) large, stout and obtuse to medium, less stout and less obtuse, shorter than tarsus (except *leucophthalmus*), angle prominent.

TARSUS stout to medium.

TAIL even.

PLUMAGE.—ADULT head without black hood (except *Ichthyæetus*), no distinct eye-ring, body plumage usually white (gray, brown or mixed in subgenus *Adelarus*) with gray or dusky mantle, wings almost wholly black in *Gabianus*, *Leucophæus* and subgenus *Adelarus*, black (or gray and white) with white rounded mirrors in *Larus*, largely white in *Ichthyæetus*, wholly white in *Pagophila*. Bill yellow, banded or black. Tail white (banded in *Gabianus*, *modestus*, *heermanni* and *crassirostris*). YOUNG deep brown, with darker wings and tail, the latter usually with white spotting or barring and not obviously banded.

Xemeæ

GENERA: *Hydrocolæus*, *Rhodostethia*, *Rissa*, *Creagrus* and *Xema*.

SIZE small to very small (wing seldom over 350 mm.). Body slender.

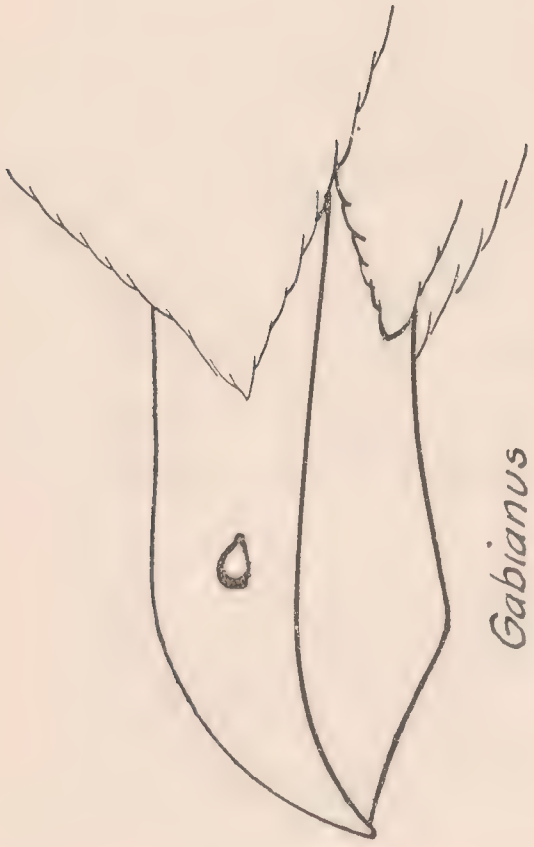
BILL (Pls. V, part, and VIII) medium to slender, shorter than tarsus (except *Rissa* and *Creagrus*), angle flattened.

TARSUS usually fairly slender.

TAIL even in *Hydrocolæus*, forked in *Creagrus* and *Xema*, emarginate in *Rissa*, and cuneate in *Rhodostethia*.

PLUMAGE.—ADULT black or brown-hooded (except in *novæ-hollandiæ*, *bulleri*, *genëi*, *Rhodostethia* and *Rissa*), distinct eye-ring white, body plumage white, mantle gray, wings with squarish mirrors or with webs largely white. Bill and feet usually red. Tail white. YOUNG brown or gray edged with brown often with wing-pattern of adult in part; tail banded.

In passing it may be said that the genus should be considered a scientific convenience for grouping species and to be really useful it should have sharply defined limits, while the subgenus may be used advantageously to group somewhat loosely allied species of a genus. Both may be useful, especially in a family like the gulls among which we find much overlapping of characters and where the grouping depends in a large degree upon the value attached to certain of these characters, some prominent and some obscure. In fact, however we may arrange the species, some member of each group is bound to have some of the characters of the others and rarely is there a species, or even a genus which has characters, or even one character, all its own. The chain connecting the species is, perhaps, not complete but even if we turn to pattern and color it becomes a question of expediency as to how the conditions found may best be met nomenclaturally. There is bound to be much latitude of opinion as to how and where generic lines shall be drawn, but it seems to me preferable to recognize a comparatively small number of clear-cut genera, some of them embracing somewhat loosely related subgenera, rather than to accept a large number of poorly defined genera. The internal characters, so far as known, do not seem to show tangible specific differences and external variations are very often more specific than generic



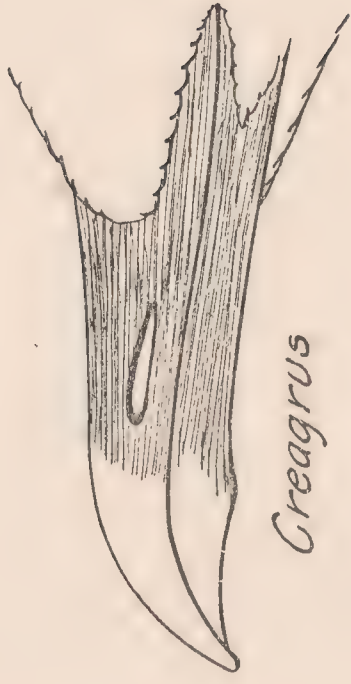
Galianus



Leucophaeus



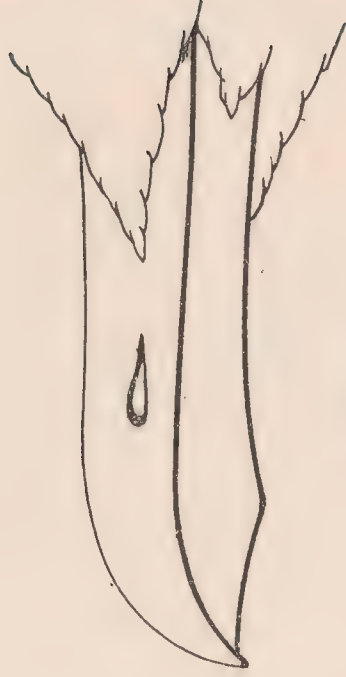
Pagophila



Creagrus



Xema



Larus



Rhodostethia



Rissa brevirostris



Rissa tridactyla



Hydrocolæus

in nature. Nothing would be gained by adopting the other alternative and recognizing a number of monotypic genera that share many characters and are only imperfectly differentiated as regards others. It seems to me that relationship is better indicated under the circumstances by not recognizing any of them by names that would obscure their very close affinities and at the same time fail to express their very slight differences.

GABIANUS

BRUCH, 1853, Journ. für Orn., p. 100. (Type: *Larus pacificus*. Latham. Monotypic.)

SPECIES: *pacificus*.

SIZE large (wing 420–450 mm.).

BILL (Pl. V) large, shorter than tarsus, compressed, depth at prominent rounded angle nearly half its length, nostril ovate or broadly pyriform, gonys curved.

TARSUS stout, digital webs rather shallow.

TAIL even.

PLUMAGE.—ADULT head, tail and underparts pure white, mantle slaty black, the tail with a black band, wings black, a white wing-band; bill yellow with red spot at angle. YOUNG brown somewhat mottled, wings black, tail black, whitish at base; bill dusky.

Birds in any plumage may always be recognized by the nearly round nostril in a very large deep-angled bill. The banded tail and black primaries indicate relationship to *belcheri* and *crassirostris*, but in size and coloration *pacificus* resembles a typical gull like *Larus marinus*.

LEUCOPHÆUS

BRUCH, 1853, Journ. für Orn., p. 108. (Type: *Larus scoresbii* Traill. Monotypic.)

SPECIES: *scoresbii*.

SIZE medium (wing 305–340 mm.).

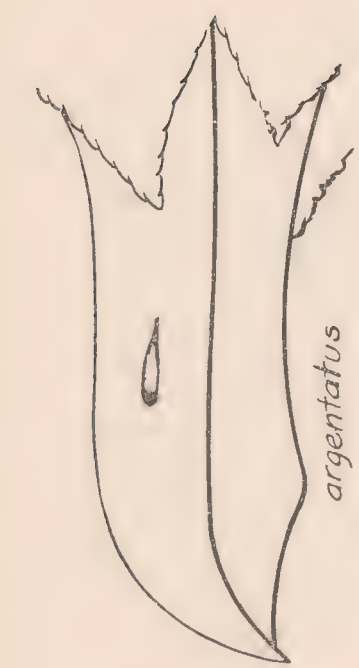
BILL (Pl. V) medium-sized, shorter than tarsus, blunt, tip of culmen rapidly decurved, angle prominent and sharp, gonys straight, nostril guttate.

TARSUS stout, digital webs rather deeply incised.

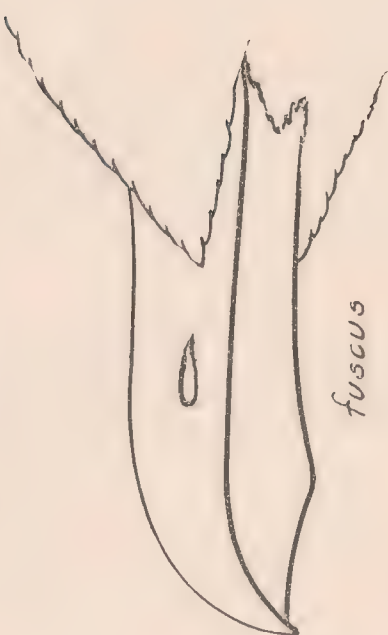
TAIL even or slightly rounded.

PLUMAGE.—ADULT head and underparts pale gray, mantle deep slate, tail white, wings black tipped with white, a broad white wing-band; bill and feet carmine. YOUNG deep brown, wings black, a white wing-band, tail white with black band, bill flesh-color with dark band towards tip.

Birds may be known in any plumage by the stout blunt bill. The black primaries, carmine bill and gray plumage in the adult suggest relationship with *heermanni*.



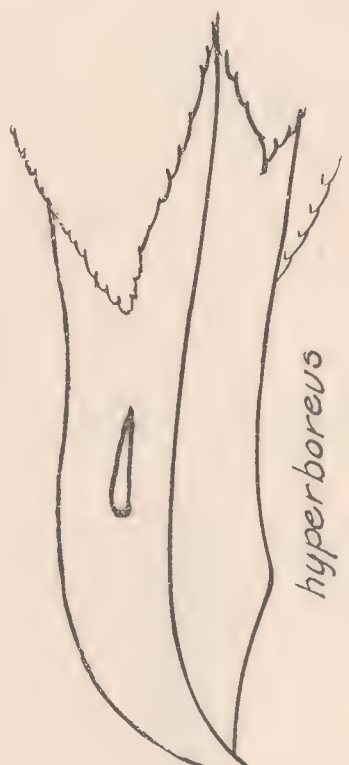
argentatus



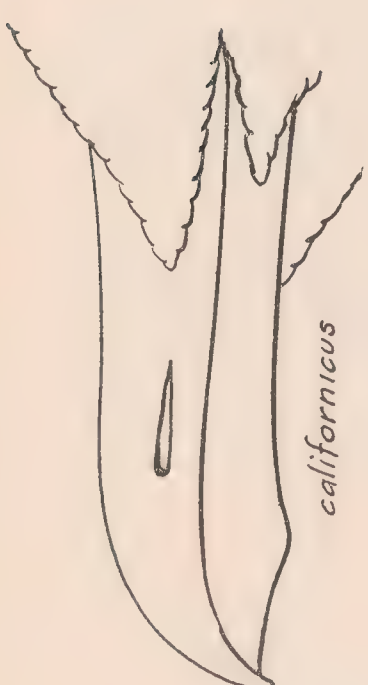
fuscus



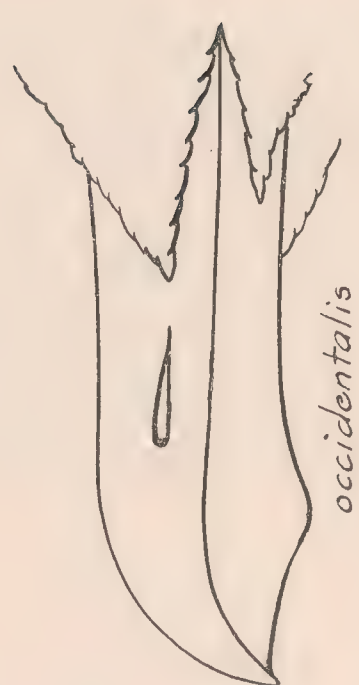
schistisagus



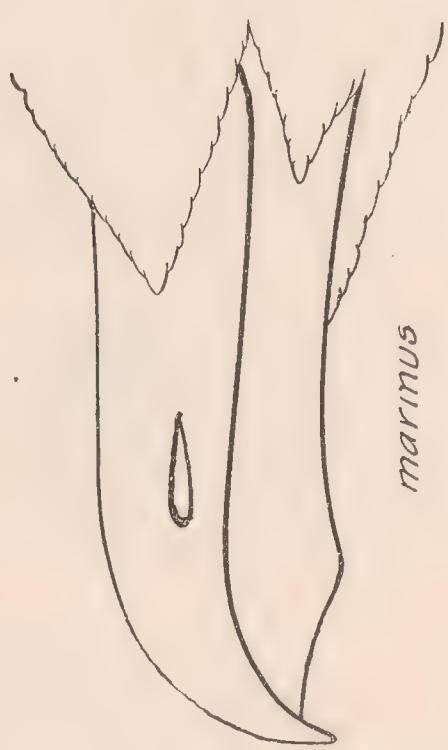
hyperboreus



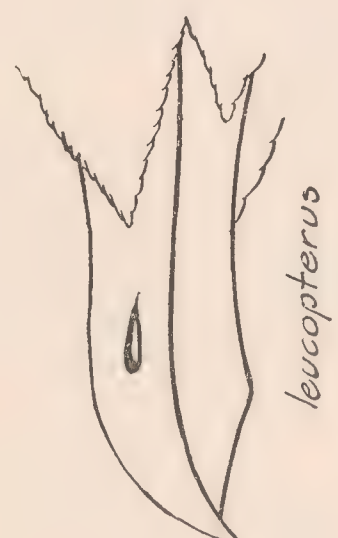
californicus



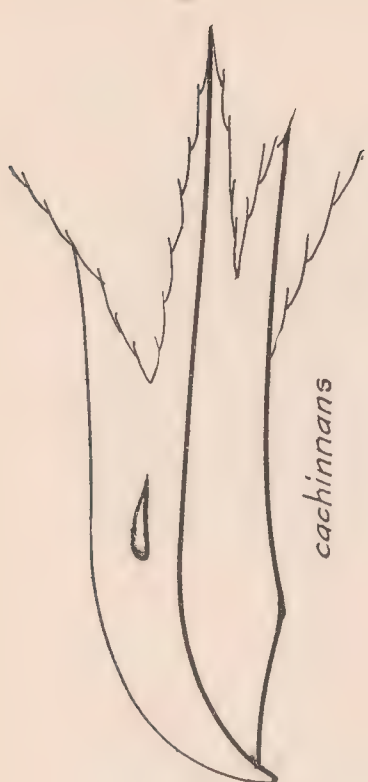
occidentalis



marinus



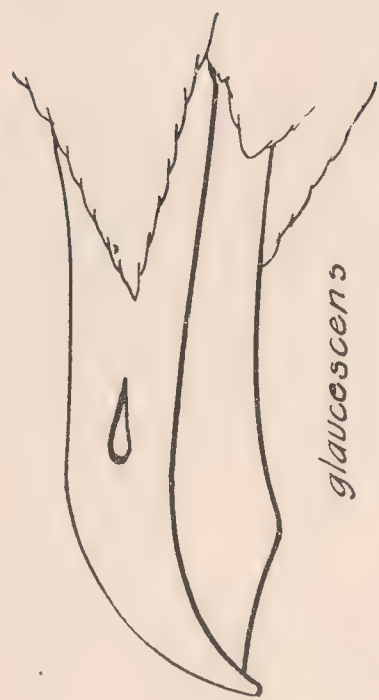
leucopterus



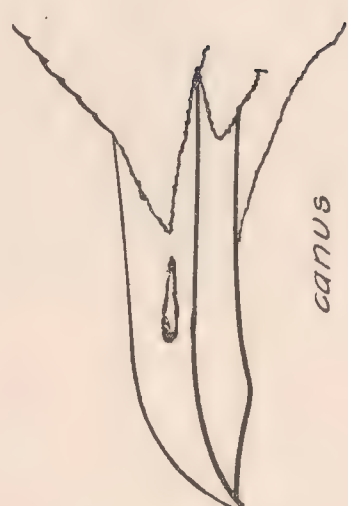
cachinnans



dominicanus



glaucescens



canus

PLATE VI

Shapes of bills in species of the genus *Larus*.

PAGOPHILA

KAUP, 1829, 'Skizz. Entw.-Gesch. u. Natürl. Syst. Europ. Thierw.,' p. 69. (Type: *Larus eburneus* Phipps = *L. albus* Gunnerus. Monotypic.)

SPECIES: *alba*.

SIZE medium (wing 320-345 mm.).

BILL (Pl. V) medium-sized, a little shorter than tarsus, rather blunt, nostril guttate, gonys nearly straight, angle slight and sharp.

TARSUS and feet short and stout, rugose or roughened, digital webs deeply incised, claws large, and sharp, tibia feathered nearly to joint.

TAIL even.

PLUMAGE.—ADULT wholly white; bill yellow. YOUNG white very sparsely spotted with black and tail with a black band, bill black.

A genus marked chiefly by much roughened tarsus and feet (resembling in this respect *fuliginosus*), strong sharp black claws, and by wholly white plumage. The bill is in shape and color like that of *canus*, and also suggests that of the jægers (*Stercorarius*). The primaries are not normally subfalcate as has been stated, but may become so if accidentally bent as in an old skin.

LARUS

LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., I, p. 136. (Type: *Larus marinus* Linnæus.)

SIZE large to rather small (wing 300-500 mm.).

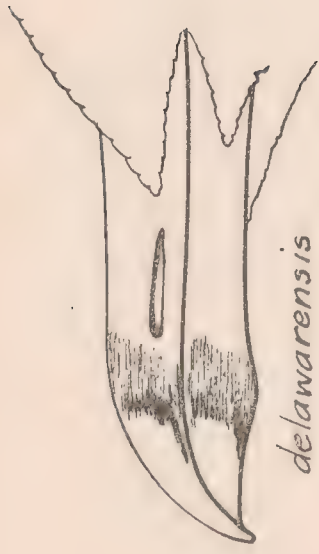
BILL (Pls. V, VI, and VII) varies from large and stout to medium-sized, angle prominent in large species, shorter than tarsus (except *leucophthalmus*), gonys usually curved, nostril guttate.

TARSUS stout and short, seldom (relatively) slender and long, longer than middle toe, webs with incisures usually shallow in large species, often deeper in small.

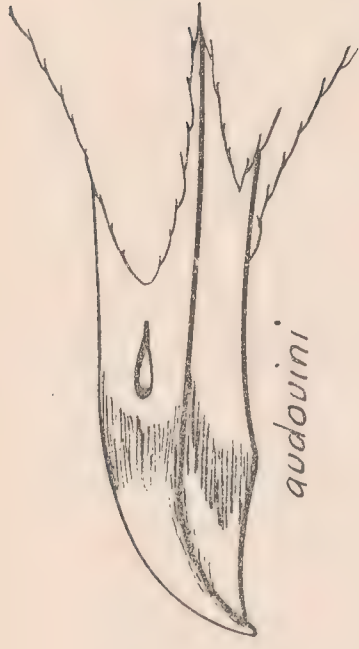
TAIL even.

PLUMAGE.—ADULT largely white (sometimes gray) with gray or dusky mantle, head usually white (streaked or clouded in winter) rarely hooded, the wings either black or patterned, a white wing band at tips of secondaries (in *fuliginosus*, gray). YOUNG chiefly brown with buff or whitish mottling, black wings and tail, the latter, in the large species, with white spotting; bill black.

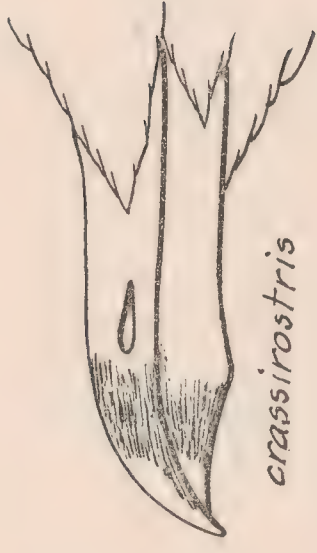
Several groups of gulls are included in this genus, for there are few distinctive characters except pattern and color by which they differ. The groups of earlier writers, such as "white-winged," "black-backed," "herring" and others that have been accorded generic rank in the past, vary chiefly in the character that produces dark birds or light birds and in the presence or absence of a band or a red spot on the bill. It seems more practical to recognize under *Larus* the following three subgenera: *Adelarus*, *Larus*, and *Ichthyaetus*.



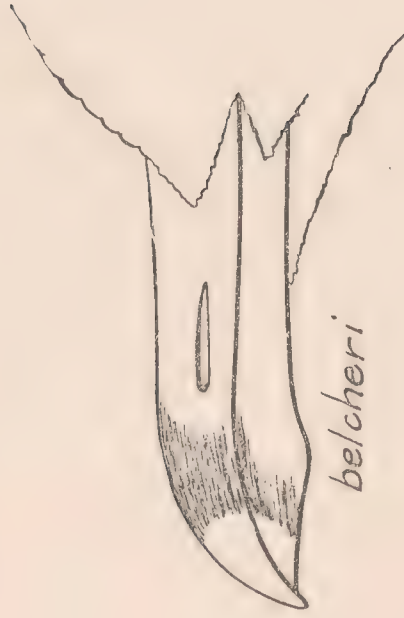
delawarensis



audouini



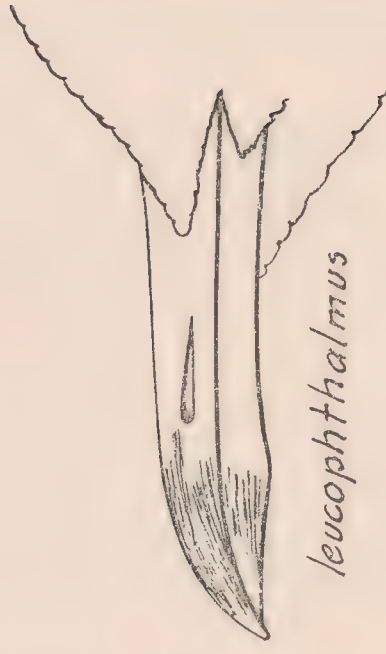
crassirostris



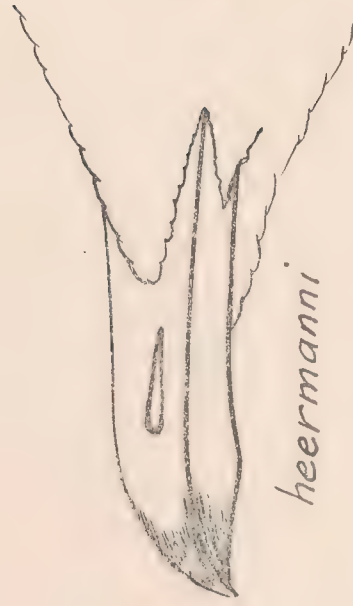
belcheri



hemprichi



leucophthalmus



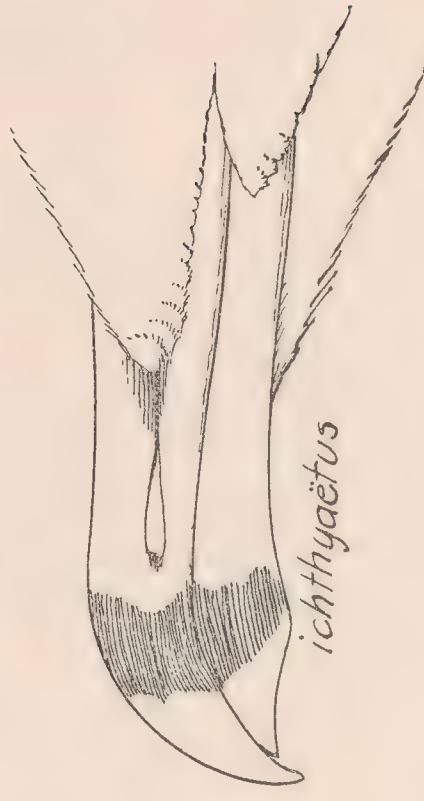
heermanni



modestus



fuliginosus



ichthyaetus

PLATE VII

Shapes of bills in species of the genus *Larus*.

Subgenus **Adelarus**

BRUCH, 1853, Journ. für Orn., p. 106. (Type: *Larus leucophthalmus* Temminck.)

SPECIES: *fuliginosus*, *modestus*, *heermanni*, *leucophthalmus*, *hemprichi*, *belcheri*, *crassirostris*.

SIZE medium (wing 300–380 mm.).

BILL (Pl. VII, part) medium-sized, rather short and stout (more slender in *leucophthalmus* and *modestus*), longer than middle toe without claw, angle not very prominent, nostril guttate.

TARSUS, rather stout; inner toe long, incisure usually shallow.

PLUMAGE.—ADULT head white in contrast to mantle (hooded in *leucophthalmus*, less obviously in *fuliginosus* and *hemprichi*), streaked or clouded in winter, wings black with practically no pattern, white wing-band (gray in *fuliginosus*), mantle dark brown or dark gray, tail white or banded; underparts dark gray or white or both; bill, colored, and black-banded at angle or tip (wholly black in *fuliginosus* and *modestus*). Tarsus dark or yellow. YOUNG brown with whitish edgings, wings and tail chiefly black, bill black or terminally black.

The seven species included in this subgenus are rather loosely related in size, in brightly colored or banded bills of the larine type, and in almost wholly black primaries and dark plumages. A dark element dominates the whole plumage, unlike any other group. Two species (*modestus* and *fuliginosus*) have black bills, two (*heermanni* and *leucophthalmus*) have bands at the tip of the bill and the others are banded at the angle. The bills of *modestus* and *leucophthalmus* are rather more slender than any of the others. *Larus belcheri*, *crassirostris*, and *modestus* are the only species of *Larus* that have banded tails when adult. In color, *fuliginosus*, *modestus*, and *heermanni* are chiefly gray, the others are partly white. The differences in characters are largely of color and are so slight and so close to those of typical species of *Larus* that there is practically no room for generic separation. *Larus leucophthalmus*, *hemprichi*, and *fuliginosus* have hoods, but in other respects are close to typical *Larus*.

Subgenus **Larus**

LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., I, p. 136. (Type: *Larus marinus* Linnæus.)

SPECIES: *audouini*, *delawarensis*, *canus*, *argentatus*, *californicus*, *cachinnans*, *fuscus*, *occidentalis*, *dominicanus*, *schistisagus*, *marinus*, *glaucescens*, *hyperboreus*, *leucopterus*.

SIZE large (wing 320–500 mm.).

BILL (Pl. VI) large, deep, usually shorter than the middle toe without claw, angle at gonys prominent, gonys curved, nostril guttate.

TARSUS rather stout, web incisures shallow.

TAIL even.

PLUMAGE.—ADULT head, tail and underparts pure white, the head with dusky streaking or clouding in winter, mantle light gray to nearly black; wings black (in

glaucescens gray, in *hyperboreus* and *leucopterus* chiefly white) usually patterned with rounded mirrors and apical spots, white and gray tongues on the primaries, a white wing-band at tips of the secondaries; bill yellow with a red spot at angle (banded as well in *audouini* and *delawarensis*) and lacking the red spot in one, *canus*; tarsus usually flesh-colored, but also yellow, rarely greenish or gray. YOUNG brown or gray mottled, the wings black without pattern, the tail black or brown mottled with white; bill black.

The fourteen species included in this subgenus form a very compact group of closely related species easily recognized in the adults of eleven by the large, angled, larvae bill, which has a red spot or blotch at the angle. Two species (*audouini* and *delawarensis*) differ in having banded bills indicating relationship to the subgenus *Adelarus*, one (*canus*) lacks the red spot, and two (*hyperboreus* and *leucopterus*) lack the primary pattern, having gray quills which pale to white at their apices. Otherwise there is great similarity in all characters. The young of all are characterized by spotted or barred tails, dark unpatterned primaries and wholly dusky or heavily banded bills.

Subgenus *Ichthyaëtus*

KAUP, 1829, 'Skizz. Entw.-Gesch. u. Natürl. Syst. Europ. Thierw.,' p. 102. (Type: *Larus ichthyaetus* Pallas. Monotypic.)

SPECIES: *ichthyaëtus*.

SIZE very large (420–500 mm.).

BILL (Pl. VII, part) large and long (longer than middle toe without claw) with very prominent rounded angle, gonys curved, nostril guttate.

TARSUS stout, web incisures shallow.

TAIL even.

PLUMAGE.—ADULT black-hooded, partly hooded in winter, white tail and underparts, gray mantle, primary pattern with much white and little black; bill yellow and banded, tarsus yellow. YOUNG brown, primaries black; tail banded.

L. ichthyaëtus is a connecting link between the large, white-headed gulls (*Lareæ*) and the small, hooded species (*Xemeæ*). It has size, bill, and wing-pattern that suggest affinity with *Larus*, but the breeding adult has a very black hood and the young bird a banded tail like all the other hooded gulls. It is a question as to which group it belongs, depending on the weight attached to the several characters.

HYDROCOLÆUS

KAUP, 1829, 'Skizz. Entw.-Gesch. u. Natürl. Syst. Europ. Thierw.,' p. 113. (Type: *Larus minutus* Linnæus.)

SIZE medium to small (wing 210–370 mm.).

BILL (Pl. VIII) medium to small, usually slender, shorter than tarsus, longer or equal to middle toe, angle not conspicuous, nostril guttate, elongated.

TARSUS usually fairly long and slender, sometimes stout; web incisures usually fairly deep, sometimes shallow.

TAIL even.

PLUMAGE.—ADULT hooded, partly so in winter, black, brown or gray, rarely non-hooded or white (*novæ-hollandiæ*, *bulleri*, *gelastes*), underparts and tail white, mantle pale to dark gray, primaries patterned with much white (except *atricilla* wholly black) on inner webs (at tips of gray quills in *minutus*) or at bases (with squarish mirrors); bill and tarsus red (in *bulleri* and *philadelphia* black). YOUNG brown or gray edged with brown, wing-pattern much like adult, underparts mostly white, bill and tarsus black, tail banded.

This genus, containing four fairly distinct subgenera, *Atricilla*, *Cirrhocephala*, *Hydrocolæus* and *Saundersia*, differs from *Larus* in slenderness of bill and tarsus, small size, presence of a hood and different wing-pattern, although a few exceptions in these characters are to be found.

Subgenus *Atricilla*

BONAPARTE, 1854, Naumannia, p. 212. (Type: *Larus atricilla* Linnæus.)

SPECIES: *atricilla*.

SIZE medium (wing 295–330 mm.).

BILL (Pl. VIII, part) medium, decidedly longer than middle toe without claw, tip long, much decurved, gonys long and much curved, angle prominent, nostril guttate, basal.

TARSUS rather stout, outer toe nearly equal to middle toe, web incisures rather deep.

TAIL even.

PLUMAGE.—ADULT black-hooded, tail and underparts white, dark gray mantle, primaries black, tipped with white, secondaries white-tipped, bill red slightly banded, tarsus blackish brown. YOUNG brown with banded tail.

This subgenus contains but a single species, marked by a slight but peculiar droop to the end of the maxillary bill as if bent on its axis. It is a connecting link between the hooded and the non-hooded gulls, having the black primaries and (generally) traces of the banded bill of the subgenus *Adelarus* and the hood of *Hydrocolæus*. In other words, it is a hooded gull with black primaries, but with some gray on the inner quills much as in *crassirostris*.

Subgenus *Cirrhocephala*

BONAPARTE, 1854, Naumannia, p. 213. (Type: *Larus cirrhocephalus* Vieillot.)

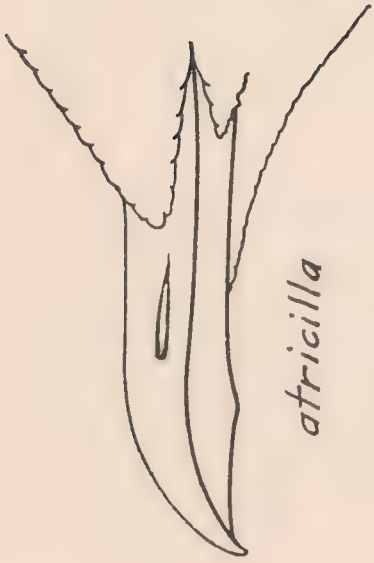
SPECIES: *brunneicephalus*, *cirrhocephalus*, *serranus*, *novæ-hollandiæ*.

SIZE rather small (wing 255–370 mm.).

BILL (Pl. VIII, part) long and rather slender, nostril guttate, gonys curved (straight in *novæ-hollandiæ*).

TARSUS rather stout, web incisures deep.

TAIL even.



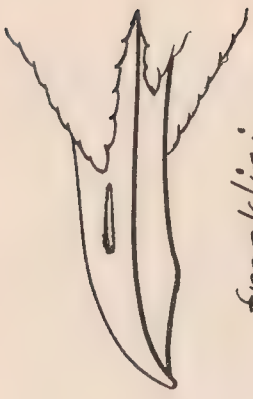
atricilla



saundersi



melanocephalus



franklini



brunneicephalus



cirrhocephalus



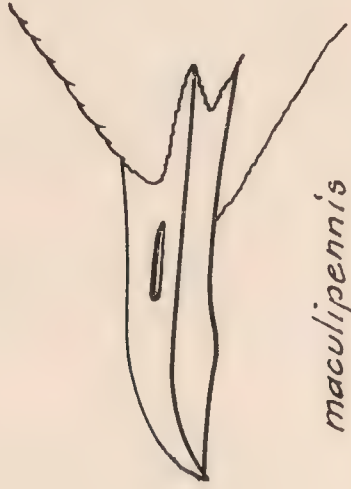
serranus



novae-hollandiae



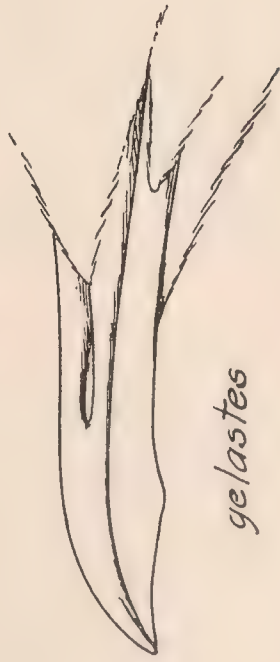
bulleri



maculipennis



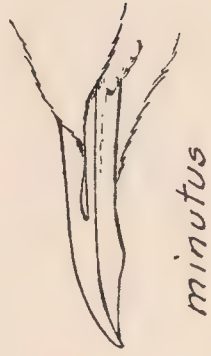
ridibundus



gelastes



philadelphia



minutus

PLATE VIII

Shapes of bills in species of the genus *Hydrocolurus*.

PLUMAGE.—ADULT hooded with black, brown or gray (in *novæ-hollandiæ* the head always white), tail and underparts white, mantle pale gray, wings largely black with squarish mirrors on the two outer, and white tongues basal on both webs of the middle primaries, secondaries without white tips (therefore no wing-band), bill and feet red. YOUNG brown or mixed with gray, the tail with a dusky band, and the body plumage with much brown, the wings sometimes without the mirrors, the basal white always present although diminished; bill and feet dusky.

This group may be recognized chiefly by the more slender sternine bills in conjunction with the primary pattern and absence of a wing-band. The first species, *brunneicephalus*, has a brown hood, *cirrhocephalus* a faint gray one, *serranus* a black one and *novæ-hollandiæ* is aberrant in having none at any season, but all agree in a wing-pattern found in no other group.

Subgenus **Hydrocolæus**

KAUP, 1829, 'Skizz. Entw.-Gesch. u. Natürl. Syst. Europ. Thierw,' p. 113. (Type: *Larus minutus* Linnæus.)

SPECIES: *melanocephalus*, *franklini*, *bulleri*, *maculipennis*, *ridibundus*, *gelastes*, *philadelphia*, *minutus*.

SIZE small (wing 210–325 mm.).

BILL (Pl. VIII, part) small, rather long and slender, angle scarcely obvious (in two species, *melanocephalus* and *pipixcan*, larger and stouter with marked angle); nostril guttate to linear.

TARSUS rather long and fairly slender, web incisures rather deep.

TAIL even.

PLUMAGE.—ADULT black-hooded, partly so in winter (except *bulleri* and *gelastes* without hoods at any season), tail and underparts white, mantle pale gray, primary pattern white (gray in *minutus*) with some black (except in *melanocephalus*) on inner webs (in *philadelphia* and *pipixcan* black only at tips), no wing-bands (except in *melanocephalus*, *pipixcan* and *minutus*); bill and tarsus red (in *bulleri* and *philadelphia* black). YOUNG brown or gray on back and head, wing-pattern much like adult, underparts white, bill and tarsus black, tail banded.

None of the included species differs from the others save in single characters. *L. melanocephalus* and *pipixcan* have decidedly larine bills, those of the others are sternine; *bulleri* has very narrow nostrils; *minutus* has a very slender bill and relatively short tarsus; *genëi* has a long slender bill with a long gonys but these and others are all differences of degree that may be better expressed specifically.

Saundersia, new subgenus

TYPE and only species: *saundersi* Swinhoe.

SIZE small (wing 270–295 mm.).

BILL (Pl. VIII, part) very stout compressed and short, longer than middle toe, angle slight, gonys curved, nostril basal, guttate.

TARSUS very slender and long, foot slender, the web incisures very deep.

TAIL even.

PLUMAGE.—ADULT black-hooded, white tail and underparts, mantle pale gray, primaries with much white on the outer webs, black or gray on inner, the tips partly black banded subterminally, a broad white wing-band, bill black. YOUNG similar, but tail slightly banded with black and with brown mixed in the plumage of the back and head.

This subgenus is distinguished by three characters. (1) It has the shortest and stoutest bill for its size of any of the gulls, although the shape is after all only a small edition of that of *Larus*; (2) it has the longest and slenderest tarsus and foot of any species of its size; and (3) the foot is almost semipalmate because of the depth of the web-incisures, somewhat resembling in this respect the foot of *L. cirrhocephalus*. It has a wing-pattern very similar to that of *bulleri* but that species has an extremely slender bill. I take pleasure in naming this subgenus after the late Mr. Howard Saunders who has made so many valuable contributions to our knowledge of gulls.

RHODOSTETHIA

MACGILLIVRAY, 1842, 'Man. Brit. Orn.,' II, p. 252. (Type: *Larus rossii* Richardson = *L. roseus* Macgillivray. Monotypic.)

SPECIES: *rosea*.

SIZE small (wing 250–265 mm.).

BILL (Pl. V, part) rather stout and blunt, very short, shorter than middle toe, angle slight, nostril basal, guttate.

TARSUS short and slender.

TAIL cuneate.

PLUMAGE.—ADULT rosy white with narrow black collar, primaries wholly gray with white tips, a white wing-band; bill and feet black. YOUNG black and white with banded tail, inner webs of primaries one-half white, the rest black, bill and feet black.

A genus characterized by the peculiar wedge-shaped tail with the middle pair of rectrices abruptly longer than the others. Primaries gray like *minutus* but without the dusky inner webs of this species.

RISSA

STEPHENS, 1826, Shaw's 'Gen. Zool.,' XIII, p. 180. (Type: *Rissa brunnichii* Stephens = *L. tridactylus* Linnæus.)

SPECIES: *tridactyla*, *brevirostris*.

SIZE medium (wing 285–320 mm.).

BILL (Pl. V, part) rather short and stout, tip decurved, about equal to length of tarsus; nostril guttate.

TARSUS short and thick, shorter than middle toe, hind toe usually rudimentary, lacking claw or with minute one.

TAIL slightly emarginate, slightly forked in young.

PLUMAGE.—ADULT head, tail, and underparts white, head clouded with bluish gray in winter, mantle gray, primaries largely white the ends black and tips white, a white wing-band, gray distally. YOUNG largely gray and white with a black band on the tail, black patch on the hind neck, and black markings or bands on wings.

The rudimentary hind toe which usually lacks a claw in *tridactyla* and more often has a minute one in *brevirostris* seems to warrant the inclusion in one genus of these two species, although the shape of the bills is different, being relatively shorter and more abruptly decurved in *brevirostris*. The extremely short tarsus (shortest relatively and actually of any of the gulls) is also a striking character. The plain-colored bill is like that of *canus*. The wing-pattern resembles that of *philadelphia* and the non-hooded head suggests relationship with *Larus*, but the tail and wing-pattern in the young bird, the tendency towards a forked tail and the short tarsus indicate closer relationship with the terns.

CREAGRUS

BONAPARTE, 1854, *Naumannia*, p. 213. (Type: *Larus furcatus* Néboux. Monotypic.)

SPECIES: *furcatus*.

SIZE medium, wing long (wing 393–435 mm.).

BILL (Pl. V, part) long, equal to tarsus, tapering, decurved at tip, broadest and deepest at base; nostril guttate.

TARSUS short and thick, length of middle toe.

TAIL deeply forked (about one-third of its length).

PLUMAGE.—ADULT with dark hood fusing at its border into white of neck and underparts, head largely white in winter, mantle dark gray with narrow white stripe on outer scapulars, primaries white on inner webs like the terns, tail white, bill black, with soapstone-gray tip. YOUNG largely black and white, the tail with a black band, bill and feet black.

A striking monotypic genus marked by a deeply forked tail and a peculiar, large and tapering bill. The primary pattern is similar to that of the terns; the mantle includes only the inner great coverts; the outer coverts, the secondaries, and the whole border of the wing being white.

XEMA

LEACH, 1819, in Ross's 'Voy. Baffin's Bay,' Append., II, p. lvii. (Type: *Larus sabini* J. Sabine. Monotypic.)

SPECIES: *sabini*.

SIZE small (wing 245–265 mm.).

BILL (Pl. V, part) short and stout, equals length of middle toe; nostril guttate.

TARSUS rather long and slender.

TAIL forked (about one-fourth of its length), the rectrices rounded at tips.

PLUMAGE.—ADULT hooded, the hood bordered by a narrow black collar, mantle dark gray, tail and underparts white, primaries black with one half of each inner web

and tip white, a white wing-band, bill black, terminal third yellow, feet black. YOUNG grayish brown with narrow buff edgings, tail with black band, bill black.

A well-defined monotypic genus characterized by a forked tail and small black and yellow bill, which, however, is rather stout for so small a species. The primaries are white on the inner webs like the terns, and this gull seems to bear close relationship to them.

SYNONYMY

A complete synonymy of each species is a field in which the ground has been already covered especially by Saunders, 1896; Ridgway, 1919; Hartert, 1921; and others. Many references, however, can not be positively allocated without specimens or other evidence that is not now available and my guesses in the matter would be no better than those of my predecessors, whose conclusions may well be accepted unless they can be proved wrong. Under every species, appearing on later pages, will be found only the earliest citation of such names as have been used for that species, so far as I have been able to verify them.

The following list includes all names that have been applied to gulls, giving the equivalent recognized in this review. The list as a whole will be found useful as a ready reference for those who are unfamiliar with the many names that have been in use up to date.

- affinis* Reinhardt, 1853 = *Larus fuscus affinis*.
- affinis* Nardo, 1859 = *Hydrocolæus melanocephalus*.
- affinis* Biddulph, 1881 = *Larus ichthyaëtus*.
- affinus* Nelson, 1883 = *Larus argentatus vegæ*.
- albipennis* Gray, 1844 = *Hydrocolæus maculipennis*.
- albus* Gunnerus, 1767 = *Pagophila alba*.
- albus* Scopoli, 1769 = *Hydrocolæus minutus*.
- albus* Müller, 1776 = *Larus marinus*.
- albus* Müller, 1776 = *Rissa tridactyla tridactyla*.
- americanus* Brehm, 1830 = *Larus argentatus thayeri* ?
- andersoni* Bruch, 1853 = *Hydrocolæus novæ-hollandiæ novæ-hollandiæ*.
- andersoni* Gray, 1871 = *Hydrocolæus novæ-hollandiæ scopulinus*.
- antarcticus* Ellman, 1861 = *Larus dominicanus*.
- antelius* Iredale, 1913 = *Larus fuscus taimyrensis*.
- antipodus* Gray, 1844 = *Larus dominicanus*.
- arabicus* Saunders, 1878 = *Hydrocolæus genëi*.
- arcticus* Macgillivray, 1824 = *Larus leucopterus*.
- argentaceus* Brehm, 1824 = *Larus argentatus argentatus*.
- argentatoides* Brehm, 1822 = *Larus argentatus argentatus*.
- argentatoides* Bonaparte, 1828 = *Larus delawarensis*.
- argentatoides* Swainson and Richardson, 1832 = *Larus argentatus thayeri*.
- argentatoides* Bonaparte, 1840 = *Larus cachinnans* ?
- argentatus* Pontoppidan, 1763 = *Larus argentatus argentatus*.

- argentatus* Sabine, 1819 = *Larus leucopterus*.
argentatus Sabine, 1821 = *Larus argentatus thayeri*.
argentatus Middendorff, 1851 = *Larus schistisagus* and *Larus argentatus vegæ*.
argentatus Godman, 1866 = *Larus fuscus atlantis*.
argentatus Taverner, 1917 = *Larus argentatus thayeri*.
argenteus Boie, 1822 = *Larus argentatus argentatus*.
assimilis Brehm, 1855 = *Larus fuscus fuscus*.
atlantis Dwight, 1922 = *Larus fuscus atlantis*.
atricapillus Abbott, 1842 = *Hydrocolæus atricilla*.
atricilla Linnæus, 1758 = *Hydrocolæus atricilla*.
atricilla Retzius, 1800 = *Hydrocolæus ridibundus ridibundus*.
atricilla Natterer, 1818 = *Hydrocolæus melanocephalus*.
atricilla Temminck, 1820 = *Larus audouini*.
atricilla Sabine, 1823 = *Hydrocolæus pipixcan*.
atricilloides Falck, 1786 = *Hydrocolæus minutus*.
audouini Payreaudeau, 1826 = *Larus audouini*.
audouini Tristram, 1864 = *Larus canus canus*.
azaræ Bonaparte, 1857 = *Larus dominicanus*.
barrovianus Ridgway, 1886 = *Larus hyperboreus*.
bathyrinchus Macgillivray, 1824 = *Gabianus pacificus*.
belcheri Vigors, 1829 = *Larus belcheri*.
belcheri Baird, 1852 = *Larus heermanni*.
belcheri Blasius, 1865 = *Larus fuliginosus*.
belcheri Pelzeln, 1873 = *Larus crassirostris*.
bonapartii Swainson and Richardson, 1832 = *Hydrocolæus philadelphia*.
bonapartii Sclater and Slavin, 1868 = *Hydrocolæus serranus*.
borealis Bruch, 1853 = *Larus argentatus vegæ* ?
borealis Brehm, 1855 = *Rissa tridactyla tridactyla*.
borealis Gray, 1871 = *Larus schistisagus* ?
borealis Seebohm, 1882 = *Larus fuscus fuscus*.
borealis Taczanowski, 1882 = *Larus glaucescens* ?
brachyrhynchus Richardson, 1831 = *Larus canus brachyrhynchus*.
brachyrhynchus Gould, 1843 = *Rissa brevirostris*.
brachyrhynchus Bruch, 1853 = *Rissa tridactyla tridactyla*.
brachyrhyncha Taczanowski, 1876 = *Rissa tridactyla pollicaris*.
brachytarsus Holboell, 1846 = *Pagophila alba*.
brehmi Heuglin, 1856 = *Hydrocolæus genëi*.
brevirostris Bruch, 1853 = *Rissa brevirostris*.
brevirostris Lawrence, 1858 = *Rissa tridactyla pollicaris*.
bridgesi Fraser, 1845 = *Larus modestus*.
britannicus Lowe, 1912 = *Larus fuscus affinis*.
bruchi Bonaparte, 1854 = *Larus delawarensis*.
brunneicephalus Jerdon, 1840 = *Hydrocolæus brunneicephalus*.
brunneicephalus Gray, 1846 = *Hydrocolæus ridibundus ridibundus*.
brunniceps Cabanis, 1853 = *Hydrocolæus brunneicephalus*.
brünnichii Stephens, 1826 = *Rissa tridactyla tridactyla*.
bulleri Hutton, 1871 = *Hydrocolæus bulleri*.
cachinnans Pallas, 1826 = *Larus cachinnans*.

- cachinnans* Lichtenstein, 1854 = *Larus fuscus affinis*.
cachinnans Kittlitz, 1858 = *Larus schistisagus*.
cachinnans Schrenck, 1859 = *Larus argentatus vegæ*.
cachinnans Seeböhm, 1877 = *Larus fuscus atlantis*.
cahiricus Saunders, 1878 = *Hydrocolæus ridibundus ridibundus*.
cahirinus Saunders, 1878 = *Hydrocolæus ridibundus ridibundus*.
californicus Lawrence, 1854 = *Larus californicus*.
candidus Müller, 1776 = *Pagophila alba*.
canescens Bechstein, 1803 = *Hydrocolæus ridibundus ridibundus*.
canescens Brehm, 1831 = *Larus canus canus*.
caniceps Brehm, 1831 = *Hydrocolæus melanocephalus*.
canus Linnæus, 1758 = *Larus canus canus*.
canus Bonaparte, 1827 = *Larus delawarensis*.
canus Swainson and Richardson, 1832 = *Larus canus brachyrhynchus*.
canus Linton, 1907 = *Rissa tridactyla pollicaris*.
capistratus Temminck, 1820 = *Hydrocolæus ridibundus ridibundus*.
capistratus Bonaparte, 1827 = *Hydrocolæus philadelphia*.
catesbæi Bonaparte, 1854 = *Hydrocolæus atricilla*.
catesbyi Bruch, 1855 = *Hydrocolæus atricilla*.
chalcopterus Lichtenstein, 1854 = *Larus argentatus thayeri*?
chalcopterus Bruch, 1855 = *Larus leucopterus*.
chalcopterus Lawrence, 1858 = *Larus glaucescens*.
cinerarius Linnæus, 1766 = *Hydrocolæus ridibundus ridibundus*.
cinerarius Fabricius, 1780 = *Rissa tridactyla tridactyla*.
cinereo-caudatus Philippi and Landbeck, 1861 = *Hydrocolæus pipixcan*.
cinereus Scopoli, 1769 = *Larus canus canus*.
cinereus Boddaert, 1783 = *Larus argentatus argentatus*?
cinerea Eyton, 1836 = *Rissa tridactyla tridactyla*.
cirrhocephalus Vieillot, 1818 = *Hydrocolæus cirrhocephalus cirrhocephalus*.
cirrhocephalum Darwin, 1841 = *Hydrocolæus maculipennis*.
cirrhocephalum Peale, 1848 = *Hydrocolæus serranus*.
cirrhocephalus Lichtenstein, 1854 = *Hydrocolæus cirrhocephalus phæocephalus*.
cirrhocephalus Hartlaub, 1877 = *Hydrocolæus novæ-hollandiæ hartlaubi*.
citrirostris Bruch, 1855 = *Rissa brevirostris*.
collaris Leach, 1819 = *Xema sabini*.
columbinus Galowatschow, 1854 = *Hydrocolæus genéi*.
consul Boie, 1819 = *Larus hyperboreus*.
corallinus Bonaparte, 1854 = *Hydrocolæus novæ-hollandiæ novæ-hollandiæ*.
crassirostris Vieillot, 1818 = *Larus crassirostris*.
crassirostris Boie, 1844 = *Larus hemprichi*.
cucullatus Reichenbach, 1848 = *Hydrocolæus pipixcan*.
cyanorhynchus Temminck, 1807 = *Pagophila alba*.
cyanorhynchus Meyer, 1810 = *Larus canus canus*.
delawarensis Ord, 1815 = *Larus delawarensis*.
delawarensis Allen, J. A., 1872 = *Larus californicus*.
dominicanus Lichtenstein, 1823 = *Larus dominicanus*.
d'orbigny Audouin, 1825 = *Hydrocolæus minutus*.
eburneus Phipps, 1774 = *Pagophila alba*.

- epargyrus* Lichtenstein, 1854 = *Larus cachinnans*.
erythropus Gmelin, 1788 = *Hydrocolæus ridibundus ridibundus*.
ethelæ Mathews, 1912 = *Hydrocolæus novæ-hollandiæ novæ-hollandiæ*.
fabricii Brehm, 1830 = *Larus marinus*.
ferroensis Bonaparte, 1857 = *Larus canus canus*.
flavipes Wolf and Meyer, 1805 = *Larus fuscus fuscus*.
flavipes Temminck, 1840 = *Larus dominicanus*.
forsteri Mathews, 1913 = *Hydrocolæus novæ-hollandiæ gouldi*.
franklini Swainson and Richardson, 1832 = *Hydrocolæus pipixcan*.
fritzei Bruch, 1855 = *Larus dominicanus*.
forbeeni Philippi and Landbeck, 1861 = *Larus belcheri*.
frontalis Vieillot, 1818 = *Gabianus pacificus*.
fuliginosus Gould, 1841 = *Larus fuliginosus*.
fuliginosus Gray, 1844 = *Larus modestus*.
fuliginosus Cassin, 1858 = *Larus belcheri*.
furcatus Néboux, 1840 = *Creagrus furcatus*.
fuscescens Bruch, 1853 = *Larus fuscus fuscus*.
fuscescens Bonaparte, 1857 = *Larus fuscus affinis*.
fuscescens Sclater, 1867 = *Larus fuscus atlantis*.
fuscescens Meves, 1871 = *Larus schistisagus?*
fuscus Linnæus, 1758 = *Larus fuscus fuscus*.
fuscus Pennant, 1788 = *Larus argentatus argentatus*.
fuscus King, 1828 = *Larus dominicanus*.
fuscus Hutton, 1847 = *Larus fuscus taimyrensis*.
fuscus Swinhoe, 1860 = *Larus argentatus vegæ*.
fuscus Pelzeln, 1873 = *Larus glaucescens* or *cachinnans?*
fuscus Saunders, 1875 = *Larus occidentalis occidentalis*.
gavia Pallas, 1826 = *Rissa tridactyla tridactyla*.
gelastes Thienemann and Brehm, 1828 = *Hydrocolæus genëi*.
genëi Brème, 1839 = *Hydrocolæus genëi*.
georgii King, 1826 = *Gabianus pacificus*.
giganteus Benicken, 1812 = *Larus marinus* or *hyperboreus*.
glacialis Brehm, 1824 = *Larus hyperboreus*.
glacialis Bruch, 1853 = *Larus leucopterus*.
glaucescens Naumann, 1840 = *Larus glaucescens*.
glaucescens Kumlien, 1879 = *Larus "kumlieni."*
glaucescens Taczanowski, 1893 = *Larus hyperboreus*.
glaucodes Meyen, 1834 = *Hydrocolæus maculipennis*.
glaucoides Meyer, 1822 = *Larus leucopterus*.
glaucopterus Kittlitz, 1836 = *Larus glaucescens*.
glaucotes Bruch, 1853 = *Hydrocolæus maculipennis*.
glaucotes Cassin, 1858 = *Hydrocolæus serranus*.
glaucus Pontoppidan, 1763 = *Larus canus canus*.
glaucus Brünnich, 1764 = *Larus hyperboreus*.
glaucus Retzius, 1800 = *Larus argentatus argentatus*.
gouldi Bonaparte, 1854 = *Hydrocolæus novæ-hollandiæ novæ-hollandiæ* or *gouldi*.
grællsii Brehm, A. E., 1857 = *Larus fuscus affinis*.
gregaria Brehm, 1855 = *Rissa tridactyla tridactyla*.

- gunni* Mathews, 1912 = *Hydrocolæus novæ-hollandiæ gunni*.
hæmatorhynchus Vigors, 1828 = *Leucophæus scoresbii*.
harengorum Brehm, 1830 = *Larus fuscus fuscus*.
hartlaubi Bruch, 1853 = *Hydrocolæus novæ-hollandiæ hartlaubi*.
hartlaubi Rochbrune, 1884 = *Hydrocolæus cirrhocephalus phæocephalus*?
heermanni Cassin, 1852 = *Larus heermanni*.
heinei Homeyer, 1853 = *Larus canus canus*.
hemprichi Bruch, 1853 = *Larus hemprichi*.
heuglini Bree, 1876 = *Larus cachinnans*.
hutchinsii Richardson, 1832 = *Larus hyperboreus*.
hybernus Tunstall, 1771 = *Larus canus canus*.
hyperboreus Gunnerus, 1767 = *Larus hyperboreus*.
ichthyaetus Pallas, 1773 = *Larus ichthyaetus*.
ichtyceus Brehm, 1824 = *Larus ichthyaetus*.
innominatus Hume, 1879 = *Larus ichthyaetus*.
islandicus Edmonston, 1822 = *Larus hyperboreus*.
islandicus Edmonston, 1823 = *Larus leucopterus*.
islandicus Bonaparte, 1857 = *Larus canus canus*.
jacksonii [editor] 1839 = *Larus argentatus argentatus*.
jamesonii Gould, 1848 = *Hydrocolæus novæ-hollandiæ gunni*.
jamesoni Wilson, J., 1831 = *Hydrocolæus novæ-hollandiæ novæ-hollandiæ*.
jamesoni Gray, 1844 = *Hydrocolæus novæ-hollandiæ scopulinus*.
kamtchatchensis Bonaparte, 1854 = *Larus canus major*.
kittlizii Bruch, 1853 = *Hydrocolæus pipixcan*.
kittlizii Swinhoe, 1860 = *Hydrocolæus saundersi*.
kotzbui Bonaparte, 1857 = *Rissa tridactyla pollicaris*.
kotzebuii Bonaparte, 1854 = *Rissa brevirostris*.
kotzebuii Bonaparte, 1856 = *Rissa tridactyla tridactyla*.
kroicocephalus Jameson, 1839 = *Larus ichthyaetus*.
kumlieni, Brewster, 1883 = *Larus leucopterus* × *L. argentatus thayeri*?
kumlieni Murdoch, 1885 = *Larus argentatus thayeri*?
lachrymosus Bruch, 1853 = *Larus canus canus*.
lachrymosus Lichtenstein, 1854 = *Hydrocolæus brunneicapillus*.
lambruschinii Bonaparte, 1840 = *Hydrocolæus genëi*.
lavrovi Sarudny, 1912 = *Hydrocolæus ridibundus ridibundus*.
leuceretes Schleep, 1819 = *Larus hyperboreus*.
leucocephalus Boissoneau, 1840 = *Hydrocolæus genëi*.
leucomelas Vieillot, 1818 = *Gabianus pacificus*.
leucomelas Lesson, 1831 = *Larus ichthyaetus*.
leucophæus Bruch, 1853 = *Larus cachinnans*.
leucophæus Dresser, 1873 = *Larus fuscus atlantis*.
leucophthalmus Temminck, 1825 = *Larus leucophthalmus*.
leucophthalmus Mühle, 1844 = *Hydrocolæus melanocephalus*.
leucopterus Vieillot, 1820 = *Larus leucopterus*.
leucopterus Bangs, 1881 = *Larus* "kumlieni."
lichtensteinii Bruch, 1857 = *Hydrocolæus genëi*.
littoreus Forster, 1781 = *Larus fuscus taimyrensis*?
littoreus Forster, 1844 = *Larus dominicanus*.

- livens* Dwight, 1919 = *Larus occidentalis livens*.
longirostris Masters, 1878 = *Hydrocolæus novæ-hollandiæ novæ-hollandiæ*.
macroptera Bonaparte, 1854 = *Hydrocolæus atricilla*.
macropterus Brehm, A. E., 1866 = *Larus fuscus fuscus*.
maculatus Brünnich, 1764 = *Larus canus canus*.
maculatus Boddaert, 1783 = *Larus marinus*.
maculipennis Lichtenstein, 1823 = *Hydrocolæus maculipennis*.
maculipennis Burmeister, 1856 = *Hydrocolæus cirrhocephalus cirrhocephalus*.
major Brehm, 1830 = *Larus argentatus argentatus*.
major Middendorff, 1853 = *Larus canus major*.
major Middendorff, 1853 = *Hydrocolæus ridibundus sibiricus*.
major Bonaparte, 1856 = *Hydrocolæus cirrhocephalus cirrhocephalus*.
marginatus Rafinesque, 1822 = *Hydrocolæus philadelphia*.
marinus Linnæus, 1758 = *Larus marinus*.
marinus Latham, 1790 = *Larus argentatus argentatus*, *L. dominicanus*, or
Gabianus pacificus.
marinus Lembeye, 1850 = *Larus argentatus smithsonianus*.
marinus Alston and Harvie Brown, 1873 = *Larus fuscus affinis* ?
marinus Swinhoe, 1874 = *Larus schistisagus*.
marinus Finsch, 1877 = *Larus cachinnans*.
massauanus Heuglin, 1861 = *Larus leucophthalmus*.
maximus Hermann, 1783 = *Larus argentatus argentatus*.
maximus Leach, 1816 = *Larus marinus*.
maximus O'Reilly, 1818 = *Larus hyperboreus*.
medius Brehm, 1822 = *Larus hyperboreus*.
medius Saunders, 1878 = *Larus fuscus fuscus*.
megalopterus Bruch, 1855 = *Hydrocolæus atricilla*.
melanocephalus Natterer, 1818 = *Hydrocolæus melanocephalus*.
melanorhynchus Temminck, 1830 = *Hydrocolæus philadelphia*.
melanorhynchus Buller, 1869 = *Hydrocolæus bulleri*.
melanotus Brehm, 1830 = *Larus fuscus fuscus*.
melanurus Temminck, 1828 = *Larus crassirostris*.
melanurus Lichtenstein, 1854 = *Larus belcheri*.
mexicanus Bonaparte, 1857 = *Larus delawarensis*.
michahellesii Bruch, 1853 = *Larus cachinnans*.
michahellii Mühle, 1844 = *Hydrocolæus melanocephalus*.
micropterus Bruch, 1855 = *Hydrocolæus atricilla*.
minor Brehm, 1830 = *Larus hyperboreus*.
minor Brehm, 1831 = *Rissa tridactyla tridactyla*.
minor Schlegel, 1844 = *Larus ridibundus ridibundus*.
minor Bonaparte, 1854 = *Hydrocolæus atricilla*.
minor Bonaparte, 1856 = *Hydrocolæus cirrhocephalus cirrhocephalus*.
minor Schlegel, 1863 = *Larus ichthyaëtus*.
minutus Pallas, 1776 = *Hydrocolæus minutus*.
minutus Sabine, J., 1823 = *Hydrocolæus philadelphia*.
minutus Bolsmann, 1852 = *Xema sabini*.
modestus Tschudi, 1843 = *Larus modestus*.
moltke Teilmann, 1823 = *Larus leucopterus*.

- mülleri* Brehm, 1830 = *Larus marinus*.
nævius Linnæus, 1766 = *Rissa tridactyla tridactyla*.
nævius Pallas, 1826 = *Larus ridibundus ridibundus*.
neglectus Bonaparte, 1854 = *Leucophæus scoresbii*.
nelsoni Henshaw, 1884 = *Larus hyperboreus* × *L. argentatus vegæ* ?
neptunus Bonaparte, 1857 = *Larus fuliginosus*.
nigripallus Dubois, 1860 = *Larus marinus*.
nigrodorsalis Brehm, 1855 = *Larus fuscus fuscus*.
nigrotis Lesson, 1831 = *Hydrocolæus minutus*.
niveus Boddaert, 1783 = *Pagophila alba*.
niveus Pallas, 1826 = *Larus canus major*.
nivea Gray, 1844 = *Rissa brevirostris*.
nivea Bonaparte, 1854 = *Rissa tridactyla pollicaris*.
niveus Bruch, 1855 = *Rissa tridactyla tridactyla*.
novæ-hollandiæ Stephens, 1826 = *Hydrocolæus novæ-hollandiæ novæ-hollandiæ*.
novæ-hollandiæ Gray, 1844 = *Hydrocolæus novæ-hollandiæ scopulinus*.
novæ-hollandiæ Legge, 1886 = *Hydrocolæus novæ-hollandiæ gunni*.
occidentalis Audubon, 1839 = *Larus occidentalis occidentalis*.
occidentalis Bruch, 1853 = *Larus delawarensis*.
occidentalis Lawrence, 1858 = *Larus occidentalis livens*.
occidentalis Martens, 1859 = *Larus argentatus smithsonianus*.
occidentalis Swinhoe, 1863 = *Larus argentatus vegæ*.
occidentalis Whitley, 1867 = *Larus schistisagus*.
occidentalis Hume, 1873 = *Larus fuscus affinis* ?
pacificus Latham, 1801 = *Gabianus pacificus*.
pacificus Layard, 1863 = *Larus dominicanus*.
pæocephalus Gurney, 1860 = *Hydrocolæus novæ-hollandiæ hartlaubi*.
pallasi Bonaparte, 1856 = *Larus ichthyaëtus*.
pallida Hodgson, 1844 = *Larus ridibundus ridibundus*.
payraudei Vieillot, 1828 = *Larus audouini*.
pelagicus Bruch, 1853 = *Larus dominicanus*.
pelagicus Taczanowski, 1876 = *Larus schistisagus*.
personatus Bruch, 1853 = *Hydrocolæus serranus*.
phænicopos Gmelin, S. G., 1770 = *Larus ichthyaëtus*.
phæocephala Strickland and Selater, 1852 = *Hydrocolæus cirrhocephalus phæocephalus*.
philadephia Ord, 1815 = *Hydrocolæus philadelphia*.
philadelphicus Turnbull, 1869 = *Hydrocolæus philadelphia*.
pileatum Brehm, 1830 = *Hydrocolæus ridibundus ridibundus*.
pipixcan Wagler, 1831 = *Hydrocolæus pipixcan*.
plumbiceps Meyer, 1822 = *Hydrocolæus melanocephalus*.
plumbiceps Brehm, 1824 = *Hydrocolæus atricilla*.
plumbiceps Bruch, 1855 = *Hydrocolæus cirrhocephalus cirrhocephalus*.
pæocephalus Gurney, 1860 = *Hydrocolæus cirrhocephalus phæocephalus* or *H. novæ-hollandiæ hartlaubi*.
poiocephalus Swainson, 1837 = *Hydrocolæus cirrhocephalus phæocephalus*.
poiocephalus Layard, 1867 = *Hydrocolæus novæ-hollandiæ hartlaubi*.

- poliocephalus* Temminck, 1820 = *Hydrocolæus cirrhocephalus cirrhocephalus*.
polionotus Pelzeln, 1871 = *Hydrocolæus cirrhocephalus cirrhocephalus*.
polios Bonaparte, 1855 = *Larus modestus*.
pollicaris Baird, Brewer and Ridgway, 1884 = *Rissa tridactyla pollicaris*.
pomarre Bruch, 1853 = *Hydrocolæus novæ-hollandiæ novæ-hollandiæ*.
pomare Bruch, 1855 = *Hydrocolæus bulleri*.
procellosus Bechstein, 1803 = *Larus canus canus*.
pygmæus Gray, 1846 = *Hydrocolæus minutus*.
quadricolor Scopoli, 1769 = *Larus audouini*.
richardsoni Lesson, 1837 = *Rhodostethia rosea*.
ridibundus Linnæus, 1766 = *Hydrocolæus ridibundus ridibundus*.
ridibundus Wilson, 1814 = *Hydrocolæus atricilla*.
ridibundus King, P. P., 1828 = *Hydrocolæus maculipennis*.
ridibundus Schlegel and Pollen, 1868 = *Hydrocolæus novæ-hollandiæ hartlaubi*.
riga Gmelin 1789 = *Rissa tridactyla tridactyla*.
rissa Brünnich, 1764 = *Rissa tridactyla tridactyla*.
roseiventris Gould, 1859 = *Hydrocolæus maculipennis*.
roseus Macgillivray, 1824 = *Rhodostethia rosea*.
rossii Richardson, 1825 = *Rhodostethia rosea*.
rubriventris Bonaparte, 1854 = *Hydrocolæus genëi*.
rudibunda Loche, 1867 = *Hydrocolæus ridibundus ridibundus*.
rufescens Bonaparte, 1854 = *Larus fuscus affinis*.
ryssa Pallas, 1769 = *Rissa tridactyla pollicaris*.
sabini Sabine, J., 1819 = *Xema sabini*.
saundersi Swinhoe, 1871 = *Hydrocolæus saundersi*.
schimperi Bruch, 1853 = *Hydrocolæus pipixcan*.
schimperi Schlegel, 1863 = *Hydrocolæus saundersi*.
schistisagus Stejneger, 1884 = *Larus schistisagus*.
scopulinus Gray, 1843 = *Hydrocolæus novæ-hollandiæ scopulinus*.
scopulinus Forster, 1844 = *Hydrocolæus novæ-hollandiæ gouldi*.
scoresbii Traill, 1823 = *Leucophæus scoresbii*.
septentrionalis Lawrence, 1857 = *Larus canus brachyrhynchus*.
serranus Tschudi, 1844 = *Hydrocolæus serranus*.
serranus Bruch, 1853 = *Hydrocolæus pipixcan*.
serranus Burmeister, 1861 = *Hydrocolæus maculipennis*.
sibiricus Buturlin, 1911 = *Hydrocolæus ridibundus major*.
smithsonianus Coues, 1862 = *Larus argentatus smithsonianus*.
subleucopterus Brehm, 1830 = *Larus leucopterus*.
subroseus Heuglin, 1856 = *Hydrocolæus genëi*.
subulirostris Bruch, 1853 = *Hydrocolæus philadelphia*.
suckleyi Lawrence, 1857 = *Larus canus brachyrhynchus*.
suckleyi Schlegel, 1863 = *Larus canus canus*.
taimyrensis Buturlin, 1911 = *Larus fuscus taimyrensis*.
tenuirostris Temminck, 1840 = *Hydrocolæus genëi*.
thayeri Brooks, 1915 = *Larus argentatus thayeri*.
tibetanus Gould, 1864 = *Hydrocolæus brunneicephalus*.
torquatus Pallas, 1826 = *Rissa tridactyla tridactyla*.

tridactylus Linnæus, 1758 = *Rissa tridactyla tridactyla*.

tridactylus Kittlitz, 1832 = *Larus tridactylus pollicaris*.

varius Brünnich, 1764 = *Larus marinus*.

vegæ Palmén, 1887 = *Larus argentatus vegæ*.

verreauxii Bonaparte, 1854 = *Larus dominicanus*.

vetula Bruch, 1853 = *Larus dominicanus*.

vociferus Bruch, 1853 = *Larus dominicanus*.

vulgaris Brehm, A. E., 1866 = *Larus marinus*.

waggellus Tunstall, 1771 = *Larus marinus*.

warnecki Coinde, 1860 = *Rissa brevirostris*.

wilsonii Boie, 1828 = *Hydrocolæus atricilla*.

zonorhynchus Richardson, 1832 = *Larus delawarensis*.

MOULTS AND PLUMAGES

TOPOGRAPHY

It is almost axiomatic that no complete study of the plumages of any species can be made without a thorough understanding of the effects of moult (ecdysis). Some of the gulls go through a series of changes that are almost startling as the birds pass from the sombre browns and black of youth to the spotless white and gray of maturity, but the changes are orderly and similar in average individuals, whether it be in the regions of the body involved or in the times at which the changes take place. It seems hardly necessary to enter fully into the question of where moult begins and ends in the feather tracts as it has been dealt with in many other contributions, still it may here be briefly summed up to advantage. Regionally considered, the feather loss and feather gain that constitutes moult starts almost simultaneously at a number of different places in the feather tracts (pterylæ), which seem to bear a close relationship to the points where arteries reach the surface and from each of these centers the feather growth expands approximately along cutaneous branches, but at whatever points the moult begins it apparently spreads chiefly backward from them.

The moult of the head begins chiefly on the crown, and below the eye. The moult of the breast begins on either side, soon forming a V-shaped band which extends to the sides and flanks, later to the middle and sides of the throat. On the back the moult begins on either side among the scapulars, the middle back and at the base of the tail. The last vestiges of the moult of the body will be found on the hind neck, the throat, the rump, on the forehead and chin and on the middle of the abdomen and the thighs. The moult of the wings is timed so that the middle of the row of flight feathers, beginning with the first or innermost primary, falls out earliest and the row of middle coverts before those adjacent.

The primaries are the time-clock of the moult, falling out and being replaced in succession outwards from the first, while the moult is progressing elsewhere.

Not until only the three or four distal or outer primaries remain do the secondaries begin to fall, their direction of moult being inward from the outermost. At about this period or when the primaries are nearly all renewed the tail begins to moult, the replacement being somewhat irregular, but usually beginning with the middle or first pair of rectrices or the next pair and ending with the fifth, or next to the outer pair which usually falls before the outer or sixth pair. The body plumage is nearly all acquired by the time the outermost primary reaches its full growth. The primaries measure the advance of the moult, the loss of the proximal or innermost quill marking the beginning and the full growth of the apparently distal, outer or tenth quill corresponding fairly closely with the end of every complete moult. Gulls have eleven primaries, but the eleventh is an inconspicuous remicle next to the base of the tenth, which is usually the longest and the one commonly known as the "outer," "outermost," "first," or "distal." There have been several ways of counting the primaries in birds, the modern, which reverses the old, being convenient anatomically, chiefly because reduction or increase in the number of primaries takes place in nearly all birds at the distal end of the series. To harmonize the notation in earlier writings with the notation used throughout this paper the concordance which follows will prove useful.

PRESENT METHOD			OLD METHOD		
1st	primary	equivalent to.....	10th	primary	(inner or proximal)
2nd	"	"	9th	"	
3rd	"	"	8th	"	
4th	"	"	7th	"	
5th	"	"	6th	"	
6th	"	"	5th	"	
7th	"	"	4th	"	
8th	"	"	3rd	"	
9th	"	"	2nd	"	
10th	"	(visible outer) equivalent to.....	1st	"	(outer or distal)
11th	"	(a minute remicle)			(not counted)

SEQUENCE

Not only does each moult proceed most methodically, but each species follows a fixed sequence of moults and plumages that may be called its plumage-cycle, the size of the species determining its length.

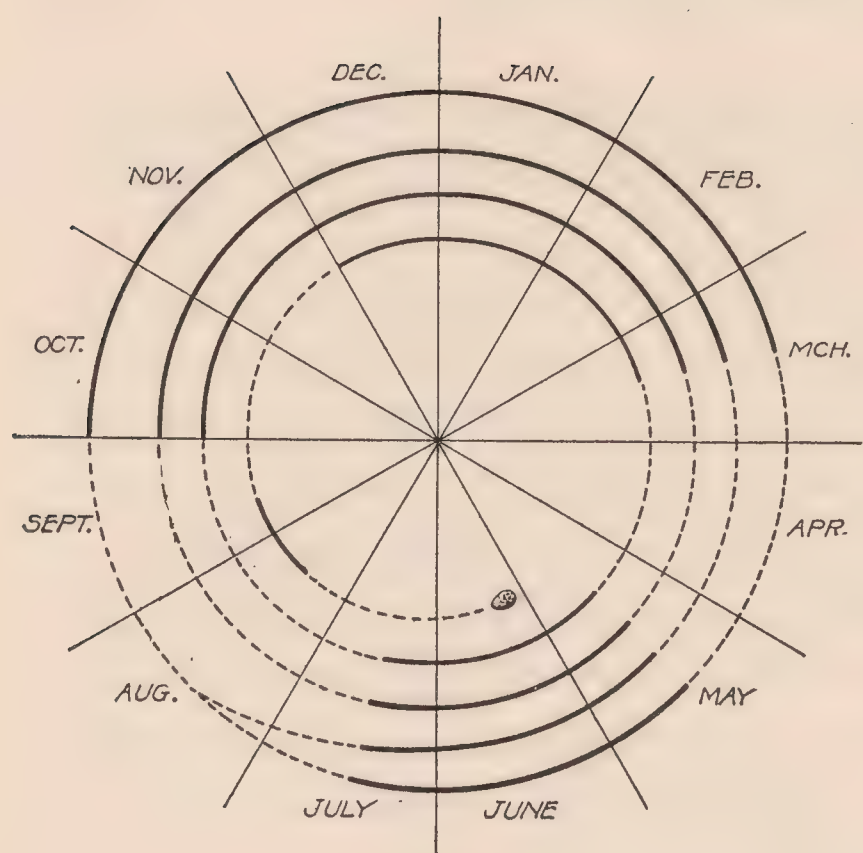


Fig. 1.

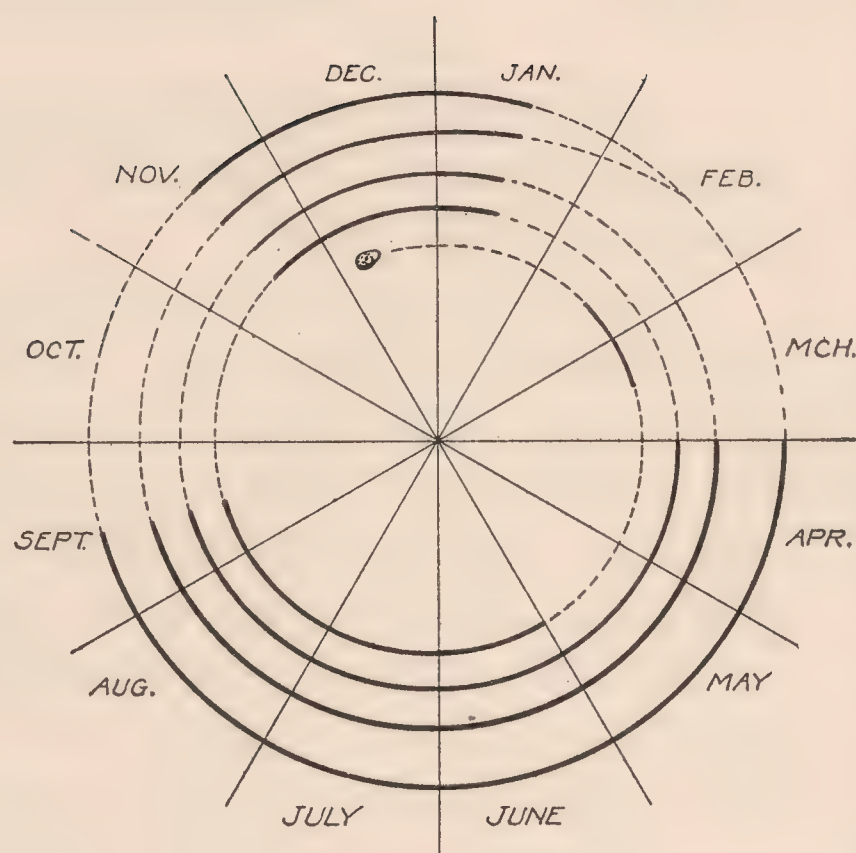


Fig. 2.

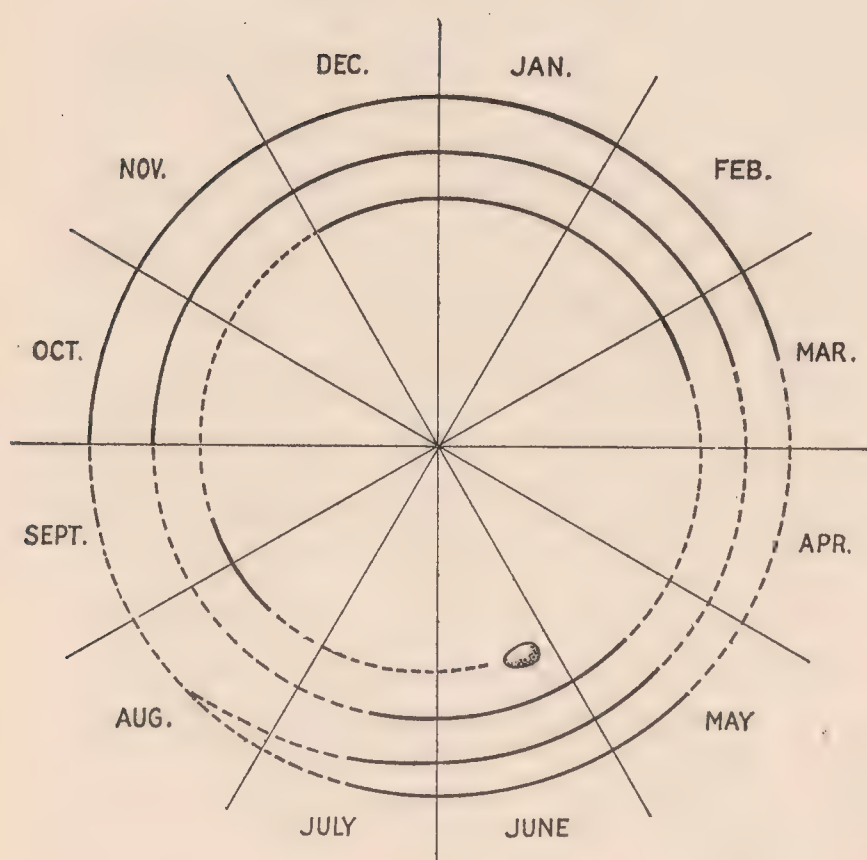


Fig. 3.

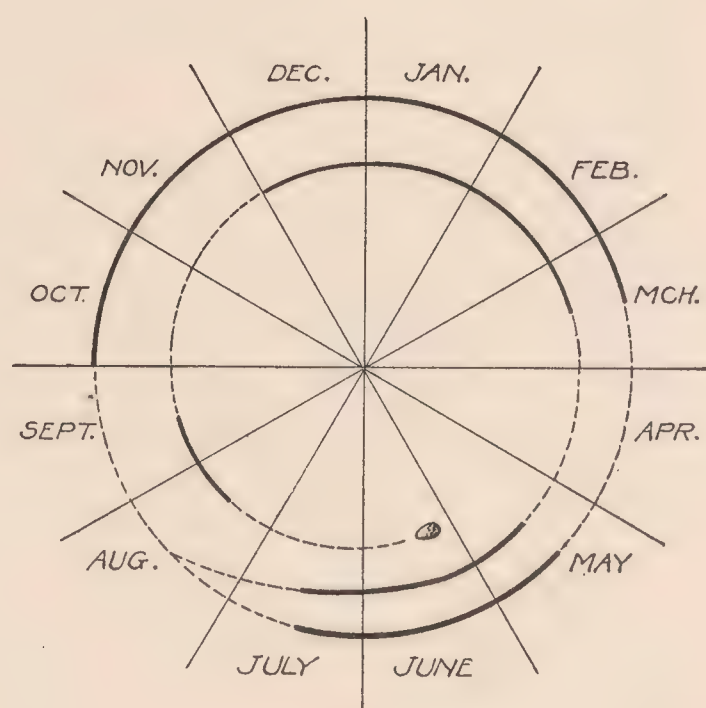


Fig. 4.

PLATE IX Plumage-cycles

Fig. 1. The four-year plumage-cycle of any large gull that breeds in the Northern Hemisphere; e.g., *Larus argentatus*.

Fig. 2. The four-year plumage-cycle of any large gull that breeds in the Southern Hemisphere where the seasons are reversed; e.g., *Larus dominicanus*.

Fig. 3. The three-year plumage-cycle of any medium-sized gull that breeds in the Northern Hemisphere; e.g., *Larus herrmanni*.

Fig. 4. The two-year plumage-cycle of any small gull that breeds in the Northern Hemisphere; e.g., *Hydrocolæus philadelphia*.

Solid lines represent periods of stable plumage. Broken lines represent periods of moult.

These matters have been so fully discussed in some earlier papers on gulls (Dwight, 1901, 1902, 1906, and 1920) that it is only necessary here to touch upon the salient points. I have, however, prepared several new diagrams (Pl. IX) that will help visualize the plumage-cycles better than linear representation can do it. To understand them let us remember that gulls moult twice every year, large species requiring three years usually to attain mature plumage (a four-year plumage-cycle), medium-sized species two years (a three-year plumage-cycle) and small species but one year (a two-year plumage-cycle). The time varies little in species of like size. The circles of the diagrams illustrate this, the solid lines representing average periods of stable plumage, and the broken ones average times of moult. In large species later years are only a repetition of the fourth year, at the beginning of which adult plumage is regularly assumed, so that four circles suffice for them (Pl. IX, figs. 1 and 2); in smaller species three circles suffice (Pl. IX, fig. 3); and in small species that become adult at the end of their first year, two circles only are required (Pl. IX, fig. 4), one for the immature plumages of the first year and one for adult plumages. The relation of the moults and plumages is such that a diagram of the plumage-cycle of a species may be constructed by moving the egg forward or backward to the month of the usual breeding season of that species and dotting in the individuals of a series under study by their dates. Birds of the Southern Hemisphere, where the seasons are reversed, breed at a period corresponding to our northern winter (Pl. IX, fig. 2), while species that breed near the equator or under equatorial conditions of heat or aridity are extremely irregular or with the moult long drawn out in the time of year covered. Some of these irregular species may be found breeding during so many months of the year that it is difficult to fix the peak of their moult, although it is probable that each colony has its individual peak, this peak perhaps varying from year to year.

Every species has one complete moult, the postnuptial, every year at the close of the breeding season, and a partial moult, the prenuptial, prior to this season, when some of the body plumage is renewed but not the wings or the tail. There seems to be but one exception to the partial prenuptial moult, viz. *pipixcan*, which, like the terns, has a complete moult. The tail is not regularly moulted at the prenuptial, so far as my observations go, excepting perhaps in one species, *maculipennis*, although now and then at this period a new feather or two comes in. When one is lost by accident the new rectrix is usually unlike the old one (unless the time happens to be very close to the previous moult) and similar to the

feather that was not due until the next moult. These odd feathers may sometimes be found partly or fully grown among their equally worn fellows and are often conspicuously white or patterned when all the other feathers are still brown or otherwise immature.

The sequence of plumages and moults in the gulls is the same as in most other species of birds but a review of them as a whole is important because the changes in plumage are sometimes surprising. The breeding plumage is the one usually stressed in ornithological works, but the winter plumage is really the more perfect, because wholly new and unworn, and therefore the more important.

NATAL DOWN

The down that thickly covers young gulls, both large and small species, is similar in them all both in tone and pattern. The chief differences to be noted in chicks are in the lighter or darker tone of the down, the extent and distinctness of the spotting or marking and the color of the legs and feet. It is often extremely difficult to identify species at this stage because the chicks of large and small species are often about the same size and many species closely resemble one another. Series of specimens are seldom available for study and many of those examined are not safely comparable because of the extremely rapid fading that takes place in the browns and buffs common to this stage of plumage. A large majority of the gulls, especially the larger species, are coarsely marked on the back with black or deep brown on a grayish dull white or buffy ground, the head is almost always more distinctly spotted and the underparts are usually dingy and grayish or buffy and mostly unspotted except for a few large rounded or elongated blackish spots on the upper throat and sides of chin and sometimes posteriorly an obscure freckling. The arrangement of the spots is practically the same in all species. The larger blurred or clouded spots of the back are in several indistinctly parallel rows, while the smaller rounded spots of the head radiate backward from the bill in chains that tend to coalesce into transverse lines on the back of the head. A median spot is usually found on the forehead close to the bill; then there is an unspotted area followed by a median and two lateral chains broken into a small number of spots on the sides of the crown, the spotting becoming coarser and transverse on the occiput. There are usually a small spot on the lores, a narrow streak through the eye, and broken chains of larger spots which pass above the eye and on the loreal and malar regions as well as on either side of the chin, where there may be a large median spot, and also another median and two

lateral spots where the upper throat begins. The spotting of the head is extremely variable, whether individual or specific, although founded on the arrangement outlined above. The chains seem to consist of broad or narrow lines that either break up differently into discrete spots or are partly and irregularly suppressed or wholly missing. The underparts are grayish white or pale buff, the throat with a buffier band and spotted only on the upper part. The down of the breast is white basally; of the throat band dusky; of the sides, flanks, and posterior parts more or less obscurely mottled or speckled. Variations from this type of natal down are largely due to a diminution of the spotting, especially on the head, or to a dilution of the black.

In a few species the spotting of the head is entirely absent and the clouding or marbling of the back is then greatly reduced as in *Rissa*, *Pagophila*, *Larus hemprichi*, and *Larus ichthyaëtus*. *Larus heermanni* is clothed with a peculiar short, woolly, creamy down, unspotted except a slight speckling of the back and crown. The general tone of the natal down, aside from fading, varies in a surprising degree from whitish to buff even in the same species. The down filaments are continuous with the barbs of the feathers that succeed them, each tuft of down at first held together by a sheath at the apex of the feather. The next stage is when the down filaments have broken free and they then remain at the tips of the barbs until worn away. The constriction of the down by the sheath is in its effect the equivalent in point of time of a rudimentary moult.

The species examined may be roughly grouped according to the general tone as follows:

(a.) Very dark and buffy.—*Hydrocolæus ridibundus*, *pipixcan*, *maculipennis*, and *genëi*; *Xema*; and *Rhodostethia*.

(b.) Dark and grayer.—*Larus marinus*, *occidentalis*, *glaucescens*, *schistisagus*, *fuscus*, *canus* and *fuliginosus*.

(c.) Paler and buffy.—*Larus dominicanus*, *argentatus*, and *audouini*; *Hydrocolæus cirrhocephalus*; *Leucophæus*; and *Gabianus*.

(d.) Paler and grayer.—*Larus delawarensis*, *californicus*, *hyperboreus*, and *belcheri*.

(e.) Dark and more finely spotted.—*Hydrocolæus atricilla*, *novæ-hollandiæ*, and *melanocephalus*.

(f.) White heads.—*Rissa*; *Pagophila*; *Larus ichthyaëtus*, *heermanni* (creamy), and *hemprichi*.

This arrangement is little more than tentative because larger series might show that some of the specimens in hand are badly faded, as I have reason to suspect.

I can throw little light from personal field observations on the colors of the legs, feet, and bill in life at this stage. A few species, *Larus occidentalis*, *delawarensis*, *californicus*, and *glaucescens*, and *Rissa*, have nearly black legs and feet in the skin, while the others seem to be paler and browner, often (probably due to the age of the skin) yellowish. It is probable that most species when very young have flesh-colored legs and feet and the bill partly dusky.

JUVENAL PLUMAGE

This is most frequently described, or spoken of, as the "first" or "immature" plumage, and it plays a very important role in the plumage-cycle. Among the larger species of gulls it is totally unlike the adult plumage and often gives no clue as to the impending changes. Among the smaller species, however, the wing-pattern very often foreshadows closely that of the adult and the body plumage may also suggest adult characters. The larger species are most frequently a dark brown with buff edgings or mottlings and have dull black wings and tail, the latter with more or less whitish mottling or spotting; a few species with reduced depth of color are a very pale gray or drab throughout. The smaller species, while their plumage is usually more or less brown and mottled nevertheless show some of the colors and patterns of the adults; the tail, however, is invariably more or less banded (sometimes widely) black or brown. All species of gulls at this stage, whether large or small, have primaries that are somewhat pointed and rectrices that are somewhat rounded, markedly different in shape (except rarely) from the feathers that grow at the later postnuptial periods of complete moult; the shape is, therefore, a very definite clue to age and there are only a very few backward or reversionary birds of the second year that cannot easily be distinguished from those of the first by these characters alone. The stable period of the juvenal plumage is not easy to determine for there seems to be great individual variation in the progressiveness of young birds and, while in some individuals the winter dress quickly begins to appear, in others it seems to come in leisurely or very late so that the postjuvenal moult may overlap in point of time the prenuptial moult.

Convincing evidence of three stages of plumage during the first winter may be found in some species where the three types of feathers may be observed side by side in species where one type cannot be mistaken for the others.

The identification of gulls in juvenal plumage, especially the larger species, has always been a stumbling block, and descriptions of this stage of plumage have been in many cases far from adequate. As a matter of fact, fully 95% of such birds may be identified in skins by a number of good characters, which are, in order of their importance, (1) generic characters; (2) size or dimensions; (3) pattern of tail; (4) pattern of primaries; (5) pattern of body plumage; (6) tone of body plumage, and (7) color and shape of bill. It is seldom that a single one of these characters is diagnostic but a combination of them is peculiar to every species, so that there are only a very few extreme or aberrant specimens that cannot be positively identified. (A key to all plumages, including the juvenal, will be found on pp. 124-129.)

FIRST WINTER OR NON-NUPTIAL PLUMAGE

This is acquired by a partial postjuvenal moult, somewhat variable in the amount of the body plumage involved and never including the wings or the tail. There is new growth on the back, head, neck, and throat, which usually replaces most of the juvenal plumage, and there is a fair scattering of new feathers elsewhere, the mid-abdominal region being the chief area that remains almost wholly juvenal. The new feathers of the larger species of gulls are usually so much like the juvenal that it is easy to mistake one for the other especially when much worn, but, as a rule, the first winter feather is paler or grayer in tone than its predecessor with the edgings fusing more into the darker median browns. The smaller species very often assume a body plumage that differs little from the adult but the tell-tale juvenal wings and tail betray them as young birds. The stable period of this stage is difficult to fix for, as the postjuvenal moult is delayed in some individuals, so is the prenuptial and some birds of any of the species will be found moulting more or less at almost any time during their first year.

FIRST NUPTIAL PLUMAGE

This is acquired by a partial prenuptial moult, which does not include (unless very exceptionally) the wings or tail, perhaps a month or two prior to the breeding season. There is no evidence that any gulls breed before they have assumed practically adult plumage and none reach this stage the first year. At this moult, in the larger species, the brown plumage is virtually assumed a second time, although the new plumage is often paler and generally whiter about the head and often grayer on the back. The smaller species, except for wings and tails,

assume more or less incompletely the adult breeding characters, especially the dark hood which so many of them display. The moult of the head is practically complete but the color in the new feathers is often deficient so that the hood, when present, may be only partly dark in color, with a mixture of new, either brown or gray or white feathers like those of the first winter.

Only one species of gull (*pipixcan*) has a complete prenuptial moult and apparently only one other (*maculipennis*) regularly moults the tail at this period. More will be said of these rare exceptions under the respective species.

SECOND WINTER OR NON-NUPTIAL PLUMAGE

This is acquired by a complete postnuptial moult towards the close of the breeding season, beginning a little later in females than in males. The smaller species of gulls at this period acquire a plumage indistinguishable in most cases from the adult; the larger species still resemble the juvenal bird. In Arctic or Antarctic species the breeding season is necessarily short and the period of moult short, while in species that breed near the equator or under equatorial conditions the breeding season is protracted and the period of moult long. These periods also seem dependent on the colonial life of gulls and vary in the same species breeding in different latitudes. In the Northern Hemisphere the peak of the moult for the majority of species is during the month of August, while in the Southern Hemisphere, the peak is usually five or six months later, in January or February although sometimes as early as November. In species of equatorial distribution the peak is often very difficult to fix, for they seem to breed almost any month in the year. This moult apparently occurs earlier in the first year than in subsequent years, although it may be that only the backward birds moult ahead (a month or more) of their fellows.

The new primaries acquired at this, the first postnuptial, moult have in all species of gulls rounded tips instead of the pointed ones of the first year and the tips of the rectrices are squarish instead of rounded. The difference in shape of these feathers is one of the best characters in distinguishing between one-year old and two-year old birds, especially of the larger species some individuals of which revert almost completely to the juvenal pattern of plumage. There is a larger percentage of backward, reversionary individuals or laggards after this moult than at any subsequent period, and it is very easy to confuse them with first winter or "young" birds. Whether such birds are also laggards at subsequent

moult it is impossible to say from the study of skins, although it is probable that they are. They are probably slow in development and regularly show it in size, in pattern, and in deficiency of color, the latter being especially noticeable in the bill, legs, feet, eyelids, iris, and mouth. There are, too, probably more laggards among the larger species which require a longer time to reach maturity. The scale is a sliding one for, while some of the smaller gulls require but one year and become adult at the first postnuptial moult, the larger species require two or three years according to their size. The normal proportion of birds that advance or fail to advance cannot be estimated with any sort of accuracy from even large series of skins, for the number in the series depends largely upon the chance luck of collectors and one cannot feel sure whether the series before him, often a small one, contains a preponderance of normal or of abnormal individuals. In the smaller species adult plumage is regularly acquired at this period and all subsequent winter plumages are like the second winter. In larger species part of the individuals acquire some of the adult plumage and part of them do not; in the largest species few individuals acquire much of the adult plumage at this age, their new plumage being a good deal like the old but often with decided traces of the adult especially noticeable on the back.

SECOND NUPTIAL PLUMAGE

This is acquired by a partial prenuptial moult prior to the breeding season. The smaller species, which already during the second winter have been wearing an adult winter plumage, now assume the adult nuptial characters and most frequently have a dark hood usually differing from the first nuptial hood in its greater depth of color and its completeness and a bill and other soft parts little if any different from the adult. The larger species, however, differ only a little from the winter dress in having whiter, less streaked heads, necks, and breasts, in more of the adult type of feathers on the back, and in brighter colors of the soft parts. The dark bills of the large species tend to lose gradually their dusky markings, the black slowly dissolving as pale color comes in to be followed another year by the brighter colors of the nearly adult stage.

THIRD WINTER OR NON-NUPTIAL PLUMAGE

This is acquired by a complete second postnuptial moult. In small species already adult this plumage is a repetition of the second winter, although sometimes more highly colored; in medium-sized species a variable proportion depending on the size (probably a majority of the in-

dividuals) acquire adult plumage; while the larger species acquire body plumages that are virtually adult but with variable evidences of immaturity shown by brown or dusky smudges of wings (especially the primary coverts) and tails, and occasional tell-tale brownish feathers elsewhere.

THIRD NUPTIAL PLUMAGE

This is acquired by a partial prenuptial moult. The body plumage of practically all species, medium-sized and large, becomes adult if it has not already done so at an earlier period of moult, and only in the largest species are there evidences of immaturity in the retained winter third year wings and tails, and in the very occasional brownish or dusky body feathers that may still grow on a few individuals. Winter characters are replaced by the nuptial in all species at this moult.

FOURTH WINTER OR NON-NUPTIAL PLUMAGE

This is acquired by a complete postnuptial moult, the third. It is at this period that the largest species of gulls become adult, only a very few individuals at most showing slight evidences of immaturity in wings, tail, or bill. There is, as I have explained, a percentage, probably small, of backward, belated, or laggard individuals in every species that fail to attain completely adult plumage when their fellows do and these, I feel sure, have led to the supposition that species take longer to attain adult plumage than is actually the case.

FOURTH NUPTIAL PLUMAGE

This is acquired by a partial prenuptial moult. In most of the large species the plumage of the body scarcely differs, if at all, from the third nuptial, the wings, tail, and bill however being fully adult. This is the plumage usually described as the "adult breeding," but the wings and the tail have been worn for nearly a year and often show a great deal of wear and fading. Later plumages are indistinguishable and we must fall back upon other characters in judging whether a bird is either two or three years old or whether three or four. Age cannot safely be determined beyond the fourth year.

Sometimes the characters are not pronounced or are so mixed in some individuals that we cannot be sure of their age but, from actual specimens moulting at the critical transition periods, I have been able to piece together the plumage-cycles of many species and from them infer what almost certainly takes place in others. Later plumages than those

of the fourth year are only repetitions of the winter or non-nuptial and of the summer or nuptial dress, but the exact changes that take place in different species as they advance to maturity are set forth in detail under the separate species on later pages. However, briefly summing up, it appears that all species normally wear four plumages in their first year, two (the natal down and the juvenal) peculiar to the young bird and two (the first winter and first nuptial) analogous to later winter and nuptial stages. After the first year in every species there are only two plumages, the winter or non-nuptial and the summer, breeding or nuptial. The smaller species acquire adult plumage at the first postnuptial moult; the larger, at the second; and the largest, at the third, the only exceptions to the general rule being a few backward individuals that sometimes seem to be a whole year behind their fellows.

VARIATION

Through variation we get the characters by which species or subspecies are recognized, and by which age and sex may be determined. The external variations may be grouped in nine classes that of necessity overlap somewhat one upon the other, viz.: (1) specific; (2) sex; (3) age; (4) size; (5) bill; (6) legs; (7) feet; (8) pattern; and (9) color.

SPECIFIC VARIATION

The characters by which species may be recognized are fundamental and constant. They underlie the other variations and determine, within specific limits, size, shape, pattern, and color. The persistent adherence to type in each species is striking, but variations or combinations of variations have apparently given rise to the species. Some of these variations have already been discussed on previous pages and they will also be taken up again under the separate species where subspecies are also discussed.

SEX VARIATION

Among the Laridæ, while the plumages in colors and patterns are alike in both sexes, there is a constant average difference in size. The only exception is in two species (*minutus* and *rosea*) where practically no differences are demonstrable. Males regularly average larger in all of their dimensions, often most strikingly obvious in the heavier, longer bill and the stouter tarsus, although in every species there are usually a small number of large females that overlap the dimensions of the smaller males.

Females, too, show a wider range of variation in size than the males, especially in the bill. Often in females the bill is shortened, while it remains relatively stout, giving the impression of large size, and again among them will be found surprising individual dips below the average size. The measurements placed under each species clearly show this and I have endeavored to exclude all specimens whose sex determination is open to doubt. The carelessness of some collectors in marking sex on original labels is almost beyond belief and has vitiated many a published record. No correct conclusions can be reached if we have no correct sexing with which to begin. Still another peculiarity due to sex is the larger number of females backward in plumage and in colors of the soft parts as compared with males. They begin their respective moults later and do not advance towards adult plumage quite as rapidly as males, for at any given stage there seems to be a preponderance of females with immature markings and these markings are regularly more extensive than are those of the males. Colors, too, are often duller and the pattern less developed.

AGE VARIATION

This has already been discussed in a general way in a previous section ("Moults and Plumages") and will be still more exactly treated under the separate species. It is important to remember that the shape of primaries and rectrices of the first year's growth differ from those of subsequent years in all species; that the feather patterns and colors everywhere also differ markedly at these periods in the larger species, while in the smaller species the patterns and colors of the adults are sometimes accurately foreshadowed as early as the juvenal stage. The age of a specimen may usually be determined by the following seven characters which here follow in order of their importance: (1) shape of primaries; (2) shape of rectrices; (3) pattern of wing; (4) pattern of tail; (5) color of bill; (6) color of legs and feet; (7) color and pattern of body plumage.

PLATE X

Diagram illustrating relative dimensions of gulls
Genera and Subgenera

- | | |
|---|--|
| 1. <i>Gabianus</i> | 8. <i>Hydrocolæus cirrhocephalus</i> (<i>Cirrhocephala</i>). |
| 2. <i>Leucophæus</i> . | |
| 3. <i>Pagophila</i> . | 9. <i>Hydrocolæus ridibundus</i> (<i>Hydrocolæus</i>). |
| 4. <i>Larus heermanni</i> (<i>Adelarus</i>). | 10. <i>Hydrocolæus saundersi</i> (<i>Saundersia</i>). |
| 5. <i>Larus argentatus</i> (<i>Larus</i>). | 11. <i>Rhodostethia</i> . |
| 6. <i>Larus ichthyaëtus</i> (<i>Ichthyaëtus</i>). | 12. <i>Rissa</i> . |
| 7. <i>Hydrocolæus atricilla</i> (<i>Atricilla</i>). | 13. <i>Creagrus</i> . |
| | 14. <i>Xema</i> . |

The dark tips of the lines indicate the extremes of variation.

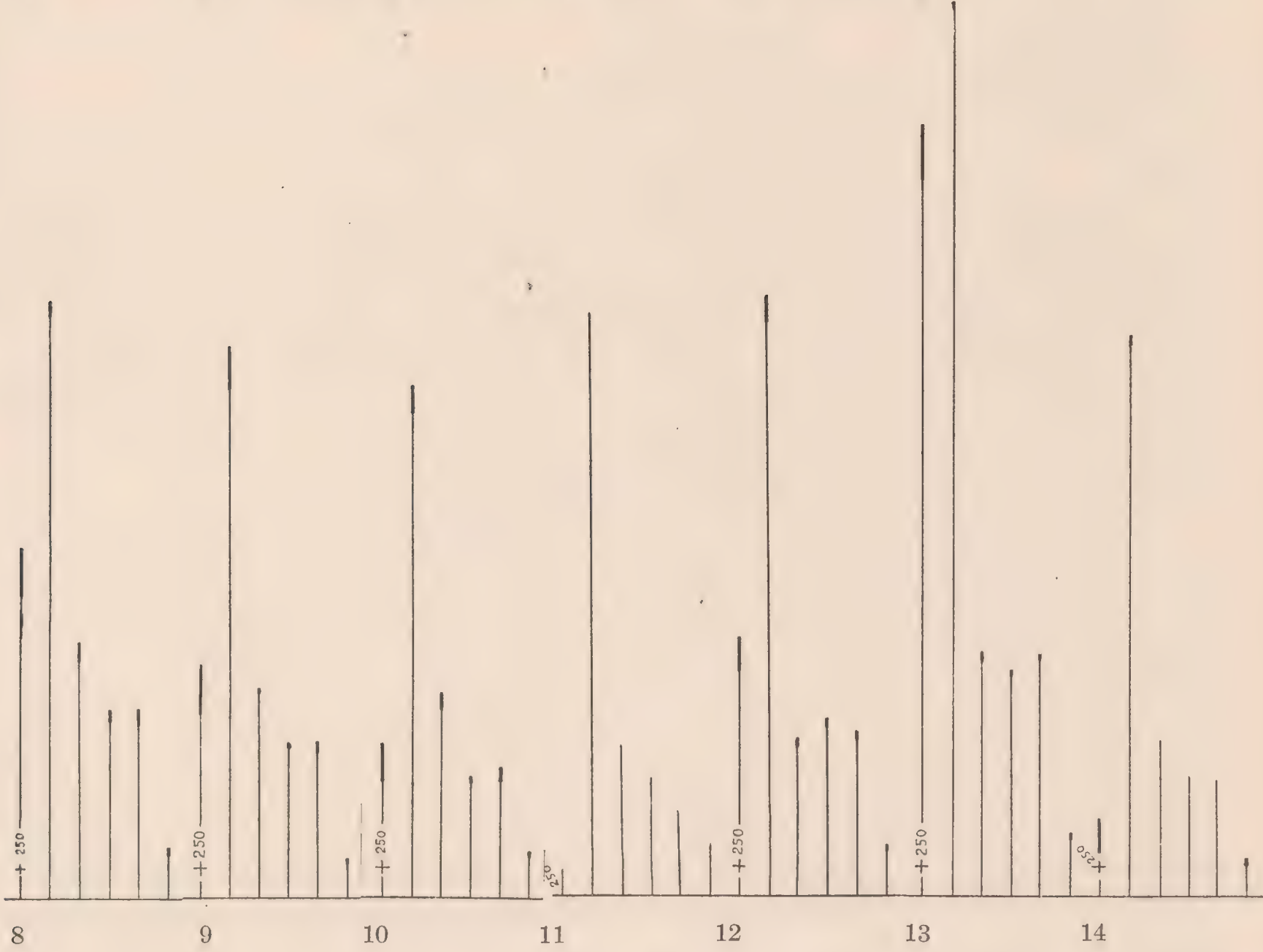
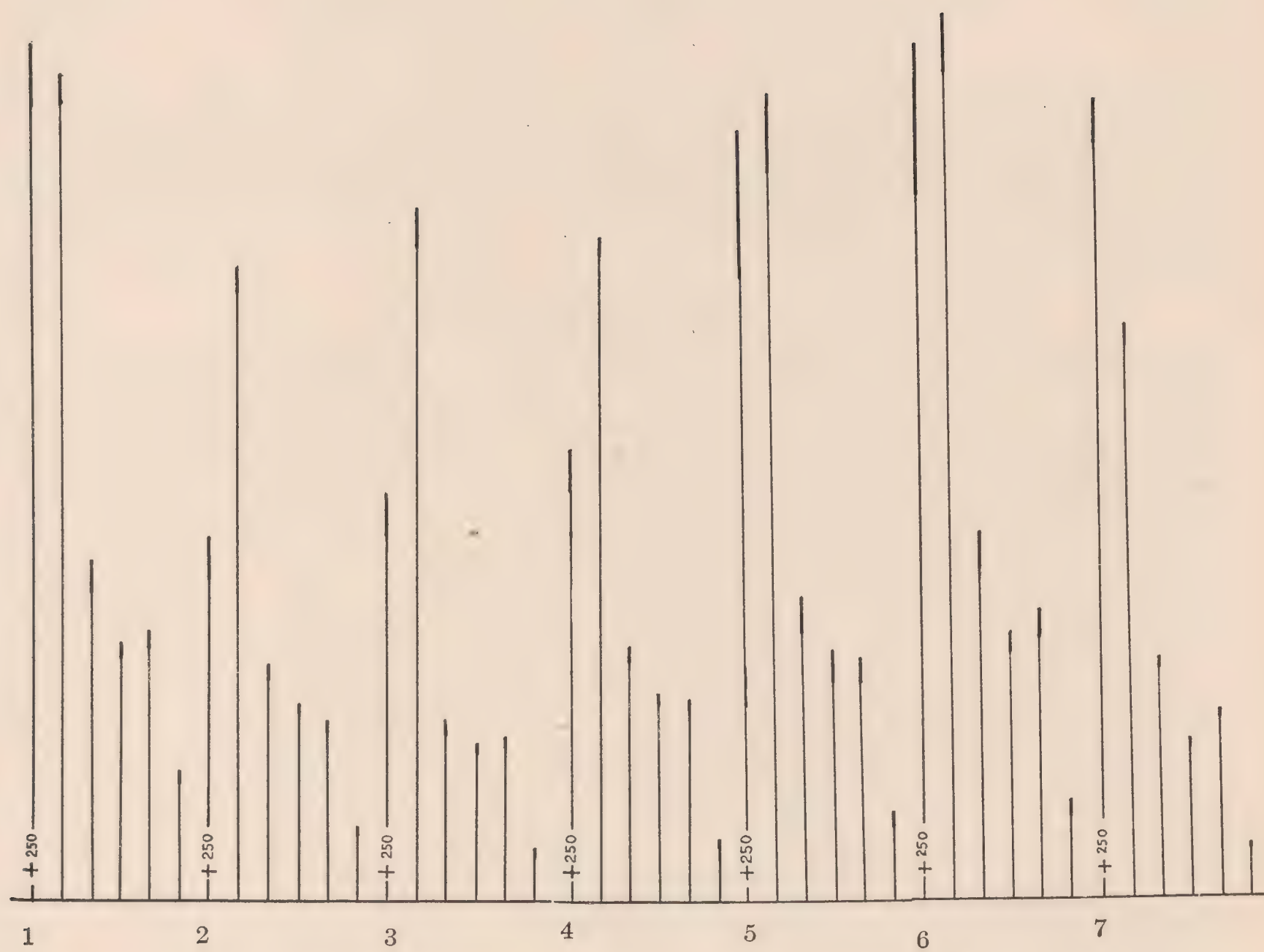


Plate X

SIZE VARIATION

Arranged according to size, best shown in the length of the wing, the gulls whether adults or young may be distributed approximately in the following three classes:

LARGE: WING 380-430 MM.

<i>Larus ichthyaëtus</i>	<i>Larus cachinnans</i>	<i>Larus leucopterus</i>
<i>marinus</i>	<i>fuscus</i>	<i>californicus</i>
<i>hyperboreus</i>	<i>occidentalis</i>	<i>Gabianus pacificus</i>
<i>schistisagus</i>	<i>dominicanus</i>	<i>Creagrus fuscus</i>
<i>argentatus</i>	<i>glaucescens</i>	

MEDIUM: WING 330-380 MM.

<i>Larus audouini</i>	<i>Larus heermanni</i>	<i>Hydrocolæus brunneicephalus</i>
<i>delawarensis</i>	<i>hemprichi</i>	<i>serranus</i>
<i>crassirostris</i>	<i>leucophthalmus</i>	<i>cirrhocephalus</i>
<i>canus</i>	<i>fuliginosus</i>	<i>Rissa brevirostris</i>
<i>belcheri</i>	<i>Leucophæus scoresbii</i>	<i>tridactyla</i>
	<i>Pagophila alba</i>	

SMALL, SLENDER: WING UNDER 330 MM.

<i>Hydrocolæus atricilla</i>	<i>Hydrocolæus ridibundus</i>	<i>Xema sabini</i>
<i>pipixcan</i>	<i>bulleri</i>	<i>Rhodostethia rosea</i>
<i>novæ-hollandiæ</i>	<i>maculipennis</i>	
<i>melanocephalus</i>	<i>philadelphia</i>	
<i>saundersi</i>	<i>minutus</i>	
<i>genëi</i>	<i>Larus modestus</i>	

Plate X shows the relative dimensions of some of the species of gulls. The reduction from natural size is a little over one-half and the lines marked "+250" represent the extreme length of wing of different species if 250 mm. be added to each line. The succeeding lines represent the actual measurements, respectively, of tail, tarsus, middle toe (without claw), bill-length and bill-depth. The dark areas at the tips of the lines represent the variation from maximum to minimum.

The variation in size is specific, subspecific, sexual, or individual. In some species size alone is almost diagnostic of birds in any plumage but it is usually necessary to compare males with males and females with females because of the average sexual difference. The smaller males of any species are smaller than the larger females, but the largest females rarely if ever attain the size of the largest males and birds so sexed in collections may well be viewed with suspicion. Young birds, when the wings and tail are fully grown, measure only a little smaller than adults except for the bill, which is slower in attaining its full growth. The tarsus, on the other hand, rapidly attains adult dimensions, being already

relatively very large when the chick hatches. The necessity for the large tarsus is doubtless because gulls are precocial, the chicks staggering about on their legs almost as soon as they are hatched.

BILL VARIATION

Plates V to VIII

The bill is perhaps the most variable of the external structural characters and consequently it has been one of the most important in generic separations. It is difficult to decide where generic lines based on bills alone can be drawn, for hardly any two species of gulls have bills exactly alike. The wide differences in length, breadth, height, decurving, depth of angle, and other peculiarities of shape are, after all, chiefly those of degree and, taken alone, furnish no firm basis on which to rest separate genera. There are really only two types of bill: the larine or stout, with a marked angle at the gonys, and the sternine or slender, with a long gonys and flattened angle, a complete series of intermediate shapes connecting them. A straight gonys gives a bill an obtuse look; a flattened angle or a gradually decurving tip makes for slenderness. Lengthening of the bill produces a flattened angle and tends to pull out the nostrils into linear shape.

A few species have other striking characters that seem to warrant their separation, but very few need to be removed from *Larus* and placed in monotypic genera if only because of somewhat peculiar bills. Creating too many monotypic genera based on nothing more than a single overlapping character tends to destroy the distinctions between genera and species and only leads to a confusion of names. Arranged according to the size of the bill, the gulls of any age or species may be divided as follows.

BILL LARGE AND STOUT

<i>Gabianus pacificus</i>	<i>Larus argentatus</i>	<i>Larus californicus</i>
<i>Larus ichthyaëtus</i>	<i>cachinnans</i>	<i>leucopterus</i>
<i>marinus</i>	<i>occidentalis</i>	<i>Leucophæus scoresbii</i>
<i>hyperboreus</i>	<i>dominicanus</i>	
<i>schistisagus</i>	<i>fuscus</i>	
<i>glaucescens</i>	<i>audouini</i>	

BILL MEDIUM-SIZED

<i>Larus delawarensis</i>	<i>Hydrocolæus melanocephalus</i>	<i>Pagophila alba</i>
<i>crassirostris</i>	<i>serranus</i>	<i>Creagrus furcatus</i>
<i>canus</i>	<i>brunneicephalus</i>	
<i>belcheri</i>	<i>cirrhocephalus</i>	

BILL MEDIUM-SIZED (*continued*)

<i>heermanni</i>	<i>novæ-hollandiæ</i>
<i>hemprichi</i>	<i>atricilla</i>
<i>leucophthalmus</i>	<i>Rissa tridactyla</i>
<i>fuliginosus</i>	<i>Rissa brevirostris</i>

BILL SMALL (USUALLY SLENDER)

<i>Larus modestus</i>	<i>Hydrocolæus maculipennis</i>	<i>Xema sabini</i>
<i>Hydrocolæus pipixcan</i>	<i>bulleri</i>	<i>Rhodostethia rosea</i>
<i>saundersi</i>	<i>philadelphia</i>	
<i>ridibundus</i>	<i>minutus</i>	
<i>genëi</i>		

In types of coloration there are five classes into which the bills of adults may be divided, as follows:

BILL YELLOW WITH RED SPOT

<i>Larus argentatus</i>	<i>Larus marinus</i>
<i>cachinnans</i>	<i>glaucescens</i>
<i>fuscus</i>	<i>hyperboreus</i>
<i>occidentalis</i>	<i>leucopterus</i>
<i>dominicanus</i>	<i>Gabianus pacificus</i>
<i>schistisagus</i>	

BILL PLAIN YELLOW

<i>Rissa tridactyla</i>	<i>Larus canus</i>	<i>Pagophila alba</i>
<i>brevirostris</i>		

BILL BANDED BLACK ON YELLOW OR RED

<i>Larus ichthyaëtus</i>	<i>Larus hemprichi</i>	<i>Larus atricilla?</i>
<i>delawarensis</i>	<i>leucophthalmus</i>	<i>Xema sabini</i>
<i>audouini</i>	<i>heermanni</i>	<i>Creagrus furcatus</i>
<i>crassirostris</i>	<i>californicus</i>	
<i>belcheri</i>	<i>melanocephalus?</i>	

BILL BLACK

<i>Larus modestus</i>	<i>Hydrocolæus bulleri</i>	<i>Hydrocolæus saundersi</i>
<i>fuliginosus</i>	<i>philadelphia</i>	<i>Rhodostethia rosea</i>

BILL RED OR REDDISH

<i>Hydrocolæus pipixcan</i>	<i>Hydrocolæus maculipennis</i>
<i>brunneicephalus</i>	<i>ridibundus</i>
<i>cirrhocephalus</i>	<i>genëi</i>
<i>serranus</i>	<i>minutus</i>
<i>novæ-hollandiæ</i>	<i>Leucophæus scoresbii</i>

The average shape of the bill of every species may be seen on Pls. V to VIII, where each outline represents a typical male chosen from a series showing variations.

The color of the bill in the chicks is largely flesh-colored, becoming partly or wholly black in the juvenal stage. During the first year these

black or black-banded bills in the larger species do not undergo much change although the paler basal area enlarges; the smaller species, however, by the beginning of the first nuptial season have adult colors more or less fully developed. Color in the soft parts may gradually change before or after moults, but color in feathers remains fixed between periods of moult. In most of the larger species the black color of the bill of the juvenal and first winter stage recedes towards the tip and is eventually lost except in certain ring-billed species where it remains fixed as a band at the angle of the gonys or including the whole tip from this point. In the second year the black in species that lose it begins to dissolve or break up into dusky cloudings that by the end of the third year have usually (not always) disappeared, leaving the bill adult in plain color. In many of the large species the bill is uniformly yellow with a patch of bright red on the lower mandible at the angle. In the smaller species the bill is usually red, less often black. The colors of bills are usually paler in the winter or non-nuptial season; the brighter tints of the breeding season being due probably to a physiological hyperæmia combined with the epidermal scaling that occurs at times of moult. This scaling is rather striking in *Pagophila alba*. In skins the yellow of bills persists for years, although less bright; red becomes browner, the color seldom lasting as long as yellow.

LEG VARIATION

The length of the tarsus relative to other parts has proved to be an important yard-stick in classification, especially its relation to the bill, the middle toe, and the tail; and its slenderness or stoutness, smoothness or roughness furnish additional characters. The legs (or tarsi) are often (like the bill) brighter colored in the breeding season than in winter. In young birds the tarsus is usually pale flesh-colored or pinkish, sometimes dusky, and in adults, according to species, it is flesh-colored, yellow, green, red, or black. Mr. Allan Brooks writes me "flesh colored feet in adult gulls show pinker in life than in the skin,—never yellow; when dead they may fade to a sort of ivory or pale cream through the blood leaving the tissues." Every collector knows the truth of this statement. In dry skins, however, all the colors become dusky browns or dull yellows, turning yellower with age.

The color of the legs and feet is of great importance and they are usually much alike in this respect. A somewhat rough classification that does not take into account all of the varying shades shows that in living adults the species fall into the following groups.

LEGS, FLESH-COLORED

Larus argentatus
occidentalis
marinus

Larus glaucescens
hyperboreus
schistisagus

LEGS, YELLOW

Larus fuscus
cachinnans
crassirostris
belcheri

Larus leucophthalmus
californicus
canus
ichthyaëtus

LEGS, RED

Hydrocolæus atricilla
pipixcan
melanocephalus
maculipennis
ridibundus
genëi
philadelphia

Hydrocolæus brunneicephalus
cirrhocephalus
serranus
novæ-hollandiæ
saundersi
minutus

LEGS, BLACK

Larus heermanni
fuliginosus

Larus modestus
Hydrocolæus bulleri

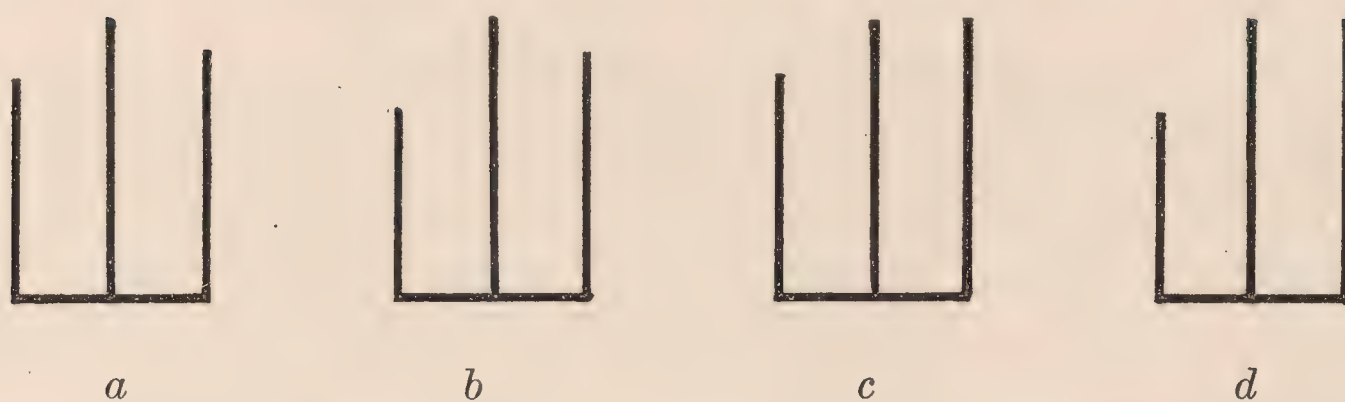
LEGS, GRAY OR GREENISH

Larus dominicanus
delawarensis

Larus audouini
hemprichi

FOOT VARIATION

What has just been said of the color of the tarsus applies in equal force to the foot. The relative length of the toes, especially the middle, and the indentation of the webs between are of some importance. In most species the webs completely fill the interdigital spaces; in others they are deeply indented or incised. The length of the toes is a character on which much reliance cannot be placed because it is variable to a considerable degree for specimens with unusually long or short toes are found now and then. The inner toe in most of the gulls reaches a little beyond the distal end of the second phalanx and the outer toe is a little shorter than the middle. This seems to be the typical arrangement. An attempt to classify toes gives the following four groups, although it is difficult to obtain accurate measurements in the dried feet of old skins, as the toes are often bent or twisted. The specific variation is often very slight and the individual variation considerable, although four intergrading types may be made out (diagram below).



Variation in length of the toes of gulls.

Right foot of: a, *Larus argentatus*; b, *Hydrocolæus brunneicephalus*; c, *Chroicocephalus philadelphia*; d, *Larus crassirostris*.

OUTER TOE NOT EQUAL TO MIDDLE; INNER TOE LONGER THAN JOINT

Larus delawarensis

canus

argentatus

californicus

fuscus

occidentalis

dominicanus

Larus cachinnans

schistisagus

marinus

glaucus

hyperboreus

leucopterus

Gabianus pacificus

OUTER TOE NOT EQUAL TO MIDDLE; INNER TOE EQUAL TO JOINT

Larus heermanni

belcheri

audouini

ichthyaëtus

Pagophila alba

Hydrocolæus atricilla

pipixcan

brunneicephalus

novæ-hollandiæ

Leucophæus scoresbii

OUTER TOE EQUAL TO MIDDLE; INNER TOE LONGER THAN JOINT

Larus fuliginosus

modestus

Hydrocolæus bulleri

maculipennis

minutus

Hydrocolæus ridibundus

genëi

philadelphia

Rhodostethia rosea

Xema sabini

OUTER TOE EQUAL TO MIDDLE; INNER TOE EQUAL TO JOINT

Larus leucophthalmus

hemprichi

crassirostris

Rissa tridactyla

brevirostris

Hydrocolæus melanocephalus

cirrhocephalus

serranus

saundersi

The webs or palmations may be slightly indented or quite deeply incised. In the former case the interdigital membrane has a rounded anterior margin; in the latter it tends to become angular, although it is difficult to determine the shape in dry skins with folded toes. There is, too, an amount of individual variation that makes the following grouping somewhat tentative. There is no hard and fast line between the groups, although the extremes are quite marked.

INCISURE OF WEB OF FOOT SHALLOW

<i>Larus argentatus</i>	<i>Larus schistisagus</i>	<i>Hydrocolæus bulleri</i>
<i>californicus</i>	<i>marinus</i>	<i>melanocephalus</i>
<i>cachinnans</i>	<i>hyperboreus</i>	<i>hemprichi</i>
<i>occidentalis</i>	<i>leucopterus</i>	<i>leucophthalmus</i>
<i>fuscus</i>	<i>delawarensis</i>	<i>Rissa tridactyla</i>
<i>dominicanus</i>	<i>audouini</i>	<i>brevirostris</i>
<i>crassirostris</i>	<i>modestus</i>	<i>Creagrus furcatus</i>
<i>belcheri</i>	<i>ichthyaëtus</i>	<i>Xema sabini</i>
<i>heermanni</i>		

INCISURE OF WEB OF FOOT DEEP

<i>Larus canus</i>	<i>Hydrocolæus serranus</i>	<i>Hydrocolæus minutus</i>
<i>fuliginosus</i>	<i>novæ-hollandiæ</i>	<i>philadelphia</i>
<i>Hydrocolæus atricilla</i>	<i>genëi</i>	<i>Rhodostethia rosea</i>
<i>pipixcan</i>	<i>ridibundus</i>	<i>Pagophila alba</i>
<i>brunneicephalus</i>	<i>maculipennis</i>	<i>Leucophæus scoresbii</i>
<i>cirrhocephalus</i>	<i>saundersi</i>	<i>Gabianus pacificus</i>

The color of the feet and the webs is usually much the same as that of the tarsus, the joints and the edges of the webs sometimes a little dusky, but fine points in color must be studied in very fresh skins because postmortem changes are surprisingly rapid, and cessation of the circulation produces almost instantaneous changes in color, the arterial blood no longer showing through the integument.

PATTERN VARIATION

This is so fixed in feathers and so uniform in species that it deserves a place among generic characters but, as it is not structural and varies with age, its claims in this respect are not sufficiently recognized. It is local in the feather and general in the plumage aggregate of feathers. It does not develop or spread gradually but is fixed in each feather as it grows, remaining unchanged until the next period of moult. In growth every feather begins at the tip, where the pattern may be seen as soon as it pushes through the feather sheath. The development is from tip to base and, once grown, the pattern (and color except for fading) remains unchanged until the feather has served its purpose and by dropping out (or being "shed") made way for a new one at the next moult. The feathers of young gulls are almost invariably dark. Blacks, browns, or grays prevail in the larger species unrelieved to any extent except on the body with pattern but in the smaller species pattern and color too will often be found. The development of pattern means a jump forward in each feather at each moult in the direction of the adult pattern, the general result being that the dark areas of immaturity lessen as the light

colored areas enlarge at their expense. The pattern and color, except for fading, do not change between periods of moult. Dark markings persist longest in the wings as subterminal bars or partial bars in a restricted zone on the outer primaries and in the tail as subterminal blotches or shaft lines on the central rectrices.

Wing

In the wing-pattern, especially of the primaries, of gulls, we have one of the most definite characters in distinguishing species and one of considerable value in classifying them. In young birds of the larger species the full adult characters do not develop until the third or fourth year, but in the smaller species the pattern is often very definite in the juvenal stage, lasting for a year, or until the first postnuptial moult, when the adult pattern is acquired. Many of the mistakes of past writers have been largely due to their ignorance of the times of moult and its consequences in pattern. The wing-pattern, too, is a valuable aid in determining the relationships of the gulls and the juvenal wing is often of as great importance as that of the adult. The diagrams of the wing-tips of each species prepared for me by Mr. Hartshorn are the most comprehensive and the most accurate of their kind ever produced. In them we get a partial picture of each species that is far better in many respects than a plate in color would be. They will be explained under the respective species, and I am glad to be able to state that no species of gull is missing among them, although it has not been possible to illustrate every plumage.

The pattern of the outer primaries in gulls is striking and it is possible to identify many species by this character, provided we know the limits of variation and the peculiarities of the successive stages of plumage. In adults there are four types of primary pattern distinguished as follows.

PRIMARIES BLACK (INNER, SOMETIMES WITH WHITISH TIPS AND WEBS)

Larus heermanni
hemprichi
leucophthalmus
modestus
fuliginosus
crassirostris

Larus belcheri
audouini
Hydrocolæus atricilla
Gabianus pacificus
Leucophæus scoresbii

PRIMARIES BLACK WITH ROUNDED WHITE MIRRORS AND CONSPICUOUS GRAY
(SELDOM WHITE) TONGUES

Larus argentatus
cachinnans
californicus
fuscus
occidentalis
schistisagus

Larus dominicanus
delawarensis
canus
marinus
glaucescens

PRIMARIES BLACK WITH SQUARISH MIRRORS AND WHITE BASAL AREAS

Hydrocolæus brunneicephalus
cirrhocephalus

Hydrocolæus serranus
novæ-hollandiæ

PRIMARIES BLACK AND WHITE (BLACK ONLY ON ONE WEB OR TERMINAL) OR GRAY

Larus hyperboreus
leucopterus
ichthyaëtus

Hydrocolæus pipixcan
melanocephalus
maculipennis
bulleri
philadelphia
genëi

Hydrocolæus ridibundus
saundersi
minutus
Rhodostethia rosea
Xema sabini
Creagrus furcatus
Pagophila alba
Rissa tridactyla
brevirostris

Another prominent character of pattern by which the gulls may be divided into classes is the presence or absence of wing-bands, the white tipping of secondaries and tertials that varies in width from narrow to broad. The two groups are as follows:

WING-BANDS PRESENT

Gabianus
Leucophæus
Larus
Rhodostethia
Rissa
Creagrus
Xema

Hydrocolæus atricilla
melanocephalus
pipixcan
minutus
saundersi

WING-BANDS ABSENT

Hydrocolæus brunneicephalus
cirrhocephalus
serranus
novæ-hollandiæ
bulleri

Hydrocolæus maculipennis
ridibundus
genëi
philadelphia

Pagophila being entirely white cannot be put in either group.

The wing-pattern, while it varies with age, remains fixed between postnuptial moults (except in *Larus pipixcan*), and the larger the species the greater the variations, because in the large gulls three postnuptial

moult are needed before adult plumage is perfected. During the first year in large species the primaries are uniformly dull black or deep brown, fading rapidly (because less deeply pigmented than in adults) and sometimes becoming surprisingly white before the year is out. *Larus glaucescens*, *Larus hyperboreus*, *Larus leucopterus*, and *Pagophila alba* are the only exceptions to the prevailing blackish color, the first three species having drab and the last having white primaries black-tipped. In some of the large species at this stage the inner flight feathers are somewhat paler on their inner webs, especially so in those having much white in the adult pattern. The second year usually brings very little change in large species, although in some birds and in some of the species the inner quills may have a foreshadowing of their future pattern, dull and indistinct as a rule. The third year shows a decided advance towards adult patterns and areas or tongues ("wedges") of gray now reach on the inner webs from the bases toward the apices of the primaries, as a rule the outer quills having either the shortest tongues or none. The primaries are now tipped with white apical spots growing progressively smaller distally and a rounded, often blurred white subapical spot or mirror develops on the outer or tenth, varying individually in size in every species. In the larger species the apical spots and the mirrors are not usually found at all or only faintly until the third winter plumage is assumed, while the tongues, especially on the inner quills, may begin to show a year sooner. The fourth year usually shows the full adult pattern, although a few backward individuals may fail to attain this in all particulars. The tongue on the outer primary of some species merges with the mirrors and in others the mirror becomes part of a wholly white tip.

In the smaller species that in the juvenal stage already show white pattern, it requires only a little expanding of the white areas to give adult pattern. They regularly acquire it at the first postnuptial moult and follow the rule that small organisms develop adult characters more rapidly than larger ones.

Tail

Tails, like wings, furnish most valuable characters for identification or for classification, a few by their shape but many by their distinctive patterns, especially in young birds. In shape they are remarkably uniform, usually truncate or even, sometimes slightly rounded and rarely emarginate or forked. Two species (*Creagrus furcatus* and *Xema sabini*) have forked tails, but not as deeply forked as in the terns; two more

(*Rissa tridactyla* and *R. brevirostris*) have tails slightly forked in the first year becoming merely slightly emarginate when adult; and one species (*Rhodostethia rosea*) has a cuneate or wedge-shaped tail. The tail-pattern is more useful in separating young birds than it is in separating adults for, in a large majority of the species, both large and small, adults have pure white tails. A very few of the larger species have black or banded tails when adult (*Gabianus pacificus*, *Larus crassirostris*, *L. modestus*, and *L. belcheri*), while the young of all of the smaller species have banded tails (always a single terminal or subterminal band of variable width and either black or brown in color).

The narrowly banded juvenal tail in the smaller species is usually replaced by a white one at the first postnuptial moult. In the medium-sized species with broader bands, dark traces are seen after this moult in a certain percentage of birds of the medium-sized species, appearing as subterminal shaft-streaks or blotches in the second year on the feather area where the band occurred in the first. *Larus pipixcan* and *Larus maculipennis* appear to be the only two exceptions that regularly effect the change from banded to white at the first prenuptial moult.

The tail-pattern is of great importance and varies according to species and age. The diagrams of its pattern are most instructive, for pattern furnishes one of the best characters in determining young birds because the juvenal tail is worn throughout the first year with only the two exceptions above noted. Juvenal tails of the larger gulls are generally dark with white basal areas, especially on the outer rectrices, more or less white-spotted, mottled, and barred, and with successive moults the white tends to extend and swallow up the black. At the first postnuptial moult the white barring breaks up into spots, the dark areas becoming freckled and the dark terminal portions of the feathers of large species become infiltrated with white, often producing a "fogged" or blurred appearance; at the second postnuptial moult tails become white with a few terminal or subterminal smudges (unless they are backward or of species banded when adult); and at the third postnuptial moult, which produces the fourth winter plumage, they become wholly white.

The following table embodies the chief differences in the tail-patterns of old and young birds.

	TAIL IN ADULT	TAIL IN YOUNG (First Year)				
<i>Larus schistisagus</i>	White	Black spotted on white ground				
<i>fuscus</i>	"	"	"	"	"	"
<i>dominicanus</i>	"	"	"	"	"	"
<i>audouini</i>	"	"	"	"	"	"
<i>cachinnans</i>	"	"	"	"	"	"

	TAIL IN ADULT	TAIL IN YOUNG (First Year)
<i>argentatus</i>	White	Black and white barred
<i>californicus</i>	"	" " " "
<i>occidentalis</i>	"	Black slightly barred or spotted with white
<i>glaucescens</i>	"	Gray, slightly barred or spotted with white
<i>marinus</i>	"	Dark brown and white, marbled
<i>hyperboreus</i>	"	Pale brown and white, marbled
<i>leucopterus</i>	"	" " " " "
<i>hemprichi</i>	"	Black
<i>leucophthalmus</i>	"	"
<i>canus</i>	"	Black-banded
<i>delawarensis</i>	"	"
<i>ichthyaëtus</i>	"	"
<i>Hydrocolæus melanocephalus</i>	"	"
<i>brunneicephalus</i>	"	"
<i>cirrhocephalus</i>	"	"
<i>serranus</i>	"	"
<i>novæ-hollandiæ</i>	"	"
<i>atricilla</i>	"	"
<i>bulleri</i>	"	"
<i>maculipennis</i>	"	"
<i>ridibundus</i>	"	"
<i>genëi</i>	"	"
<i>philadelphia</i>	"	"
<i>minutus</i>	"	"
<i>Leucophæus</i>	"	"
<i>Pagophila</i>	"	"
<i>Rhodostethia</i>	"	"
<i>Rissa tridactyla</i>	"	"
<i>Creagrus</i>	"	"
<i>Xema</i>	"	"
<i>Hydrocolæus saundersi</i>	"	"
<i>pipixcan</i>	"	"
	(middle rectrices gray)	"
<i>Larus fuliginosus</i>	Gray	Black
<i>heermanni</i>	Black (white tip)	"
<i>crassirostris</i>	Black- banded	Broadly black-banded
<i>belcheri</i>	Black- banded	"
<i>modestus</i>	Black- banded	"
<i>Gabianus</i>	Black- banded	"
<i>Rissa brevirostris</i>	White	White

Body

In most species the pattern of the feathers of the body is simple. The mantle (which includes the back, scapulars, tertials, wing-coverts and usually the secondaries) in adults is gray, rarely nearly black or brown, and the rest of the plumage (except in a few species) is white. In young birds brown everywhere prevails, often mottled with paler feather-edgings.

By the presence or absence of a hood in nuptial plumage the gulls may be divided into two major classes, but the extent of the hood and its color (most often black) is variable. It occurs only exceptionally in large species but is almost universal in the small species and always associated with other characters which are probably more fundamental.

BLACK HOOD

*Larus ichthyaëtus**leucophthalmus**fuliginosus**Hydrocolæus pipixcan**melanocephalus**serranus**saundersi**Hydrocolæus philadelphia**atricilla**minutus**Creagrus furcatus**Xema sabini*

BROWN HOOD

*Hydrocolæus ridibundus**maculipennis**brunneicephalus**Larus hemprichi*

GRAY HOOD

*Hydrocolæus cirrhocephalus**Leucophæus scoresbii*

WITHOUT HOOD

*Larus argentatus**californicus**cachinnans**fuscus**occidentalis**dominicanus**schistisagus**marinus**hyperboreus**Larus glaucescens**leucopterus**canus**delawarensis**audouini**crassirostris**belcheri**heermanni**modestus**Hydrocolæus bulleri**novæ-hollandiæ**genëi**Gabianus pacificus**Pagophila alba**Rhodostethia rosea**Rissa tridactyla**brevirostris*

COLOR VARIATION

Under this heading are included two separate matters: (1) the colors of the "soft parts," which include the bill, the legs, the feet, the iris, the fleshy eyelids, the gape or rictus, the inside of the mouth, and the tongue; and (2) the colors of the plumage.

(1.) The first is a matter already touched upon on an earlier page and it will be discussed at length under the separate species. It will bear a good deal of further investigation and still needs a large amount of careful field experience and patient record. The standard books are filled with inaccurate descriptions and even the records found on original labels cannot always be depended upon. Postmortem changes are often very rapid and, besides, in the course of time fading, browning, and yellowing may obliterate all traces of the colors that prevail in life and reduce widely differing colors, such as flesh, reds and yellows, to one common dingy hue.

The brush of an artist-ornithologist, Mr. Allen Brooks, has enabled me to obtain some of these details of "soft parts" faithfully in color, portraying a few North American species, but I cannot vouch for the accuracy of colors that I have been obliged to quote from labels or from other sources, although I have only ventured to utilize those that I have reason to believe are correct. Two plates in color (Witherby, 1914) of the bills at different ages of *Larus fuscus affinis*, and *Larus marinus* are, however, valuable contributions to this subject and worthy of special citation. Dr. L. B. Bishop has kindly placed at my disposal his accurate and useful notes on some of the North American species. His colors are matched with those of Ridgway's (1912, 'Color Standards') and are extremely accurate because promptly postmortem. They show sometimes in birds of apparently the same age surprising variations that may be attributed either to individual backwardness, precocity, or to possible variations in the postmortem changes.

In small species, with flesh-colored, dark, or partly dark bills when young, some of the colors of the adult develop very much sooner than in large species, even as early as the first nuptial season. The legs, feet, iris, and eyelids in their turn become pigmented much more quickly than the horny bill, and the color in nearly all of them varies according to the time of year, being brightest during the breeding season and dulling at its close. The adults of many of the large species in winter have somewhat duller bills; small species with wholly red bills in summer are not only duller in winter (sometimes nearly black), but they may show a dusky tip as well. In large species which have black or dusky bills when young, the black gradually dissipates, persisting longest in a band crossing both mandibles at the angle of the lower, where it remains during the second year and often shows obscurely in the third and rarely even in the fourth. Yellow seems to be a color that persists in old skins, all the others fading out, although some reds last very long.

(2.) The colors in the plumages of most of the gulls are very simple. Adults in the breeding season have, in the majority of species, gray to dusky mantles and variously patterned wings, with white everywhere else; some have hoods of black, brown, or gray; some are wholly gray. In winter plumage both the hooded and the non-hooded become white-headed with more or less occipital and auricular duskiness or grayness that sometimes amounts to a half-hood much like that of the terns. The darker the mantle the less streaked is the head in winter. Gulls in juvenal plumage are often very similar, one species to another, and are sometimes difficult to identify, for in many species the wings are almost wholly black or deep brown and the body plumage brown or grayish more or less mottled with buff edgings.

The development of pattern in the wings and tail has already been explained on an earlier page and details will also be found under the separate species, where the pattern and color of the body plumage as well may be better discussed. Young birds begin life with a plumage that is brown or grayish and inconspicuous because of mottlings and edgings; and fresh color comes into the plumage only with the growth of new feathers at periods of moult. The only changes that occur at other times are due to wear, which includes the loss of feather-edgings and fading. The grayish and blackish browns regularly fade to paler browns or even white, the browns after the lapse of time becoming sometimes reddish or rusty-tinged and the buffs regularly fading to white. Wear is accelerated as the time for moult approaches, many specimens becoming more ragged and bleached in the few weeks prior to the postnuptial moult than during all the previous winter months. The tail in the larger gulls is either deep brown or black mixed with more or less basal white, barred or spotted; in the smaller species it is regularly banded; in a few species it is black. As a rule, it affords, next to size, the best character we have for the identification of young birds in their first and often in their second year. The colors in my descriptions correspond quite closely to those of Ridgway's 'Color Standards,' 1912, but in some of them I have often found this work impracticable because of its minute subdivisions. In describing a particular specimen exactness is desirable, but in the plumage of a species, the normal variation overlaps into so many different shades of color that it is next to impossible to specify which named color represents the normal and therefore less exact terms often serve my purpose better. My eye, too, fails to detect the blue shade indicated in the "gull grays." Human eyes see colors differently. The shades of gray in the mantles of gulls are delicate and extremely

variable, depending upon the direction from which the light comes, the time of day, condition of the weather, shadows from the overlapping feather edges, and other factors that should be reckoned with if scientific exactness in color determination is to be expected. Colors may be classified by exact methods and be displayed on flat surfaced plates, but too great refinement in applying minute classification to the colors of a structure as complex as a feather may well prove, under present imperfect methods of comparison, a hindrance rather than a help.

In the following table the gulls have been arranged according to the color of their mantles, so that typical birds will fall into one of nine classes, the species first mentioned in each class being perhaps a trifle lighter in tone than those placed later. But individual or seasonal variation in a species or a subspecies will sometimes be sufficient to carry individuals from one class to another when the effort is made to determine their exact position. I have endeavored to arrange the gulls in order according to the shade of their mantles (choosing the middle of the back for comparisons) from lightest to darkest. The greatest difficulty has been to select birds typical of the species or subspecies as each shows variation within certain limits that are hard to fix by any standard. The hooded species seem to have the wing-surface darker than the rest of the mantle, while the other species are of the same tone. So far as possible, the specimens selected have been in perfectly fresh plumage either adult nuptial or non-nuptial. The pale grays of new plumage are often a shade bluer, the new feathers becoming in time paler, especially on the whitened, bleached edges, while the deep grays and the blacks become much browner.

COLOR OF MANTLE

1. Pallid Neutral Gray (near the "Pearl-gray" of Authors)

Hydrocolæus melanocephalus
genëi
bulleri
brunneicephalus
serranus

Larus glaucus
leucopterus
Hydrocolæus ridibundus ridibundus
ridibundus sibiricus

2. Pale Neutral Gray (near the "Pearl-gray" of Authors)

Hydrocolæus minutus
saundersi
maculipennis

Larus argentatus argentatus
argentatus thayeri
audouini
delawarensis
Rhodostethia rosea

3. Light Neutral Gray (near the "French Gray" of Authors)

<i>Larus canus canus</i>	<i>Hydrocolæus novæ-hollandiæ</i>
<i>canus brachyrhynchus</i>	<i>philadelphia</i>
<i>ichthyaëtus</i>	<i>cirrhocephalus</i>
	<i>Larus cachinnans</i>

4. Neutral Gray (near the "Plumbeous" or "Cinereous" of Authors)

<i>Larus californicus</i>	<i>Creagrus furcatus</i>
<i>glaucescens</i>	<i>Xema sabini</i>
<i>Rissa tridactyla tridactyla</i>	<i>Larus argentatus vegæ</i>
<i>Rissa tridactyla pollicaris</i>	<i>canus major</i>

5. Deep Neutral Gray (near the "Lead-gray" of Authors)

<i>Larus crassirostris</i>	<i>Hydrocolæus pipixcan</i>
<i>occidentalis occidentalis</i>	<i>atricilla</i>
<i>fuscus atlantis</i>	<i>Rissa brevirostris</i>

6. Dark Neutral Gray (near the "Lead-gray" or "Slate-gray" of Authors)

Larus fuscus affinis
fuscus taimyrensis
occidentalis livens
schistisagus
modestus

7. Deep Mouse-gray (The "Deep Slate" of Authors)

Larus heermanni
fuliginosus
leucophthalmus
Leucophæus scoresbii

8. Slaty Black

Larus dominicanus
marinus
fuscus fuscus
belcheri
Gabianus pacificus

9. Hair-brown

Larus hemprichi

STUDY MATERIAL, MEASUREMENTS, AND EXPLANATIONS

The rich material at my disposal, drawn from the many sources above enumerated, has included specimens showing at least one and often all of the plumages of every known species of gull. From the series it has been possible to select birds from which the accurate diagrammatic sketches of pattern in wings and tails have been made by Mr. H. Ira Hartshorn, who has also greatly aided me in preparing the outlines of

bills and in other ways. All of these details were originally drawn to scale. My purpose has been to illustrate the average pattern in both young and old birds with some of the variations found so that direct comparison may be made species by species and the development of pattern traced in successive plumages. My endeavor to obtain color sketches of the "soft parts" has been less successful. The inaccuracies of many published plates and faulty descriptions in standard works of the colors of eyes, bills, and feet are surprising, to say the least. I have been fortunate in obtaining from Mr. Allan Brooks color sketches of the heads and feet of a number of North American species and the fidelity of coloring of this artist is obvious almost without comment, the sketches being made on the spot from fresh birds. Postmortem changes are extremely rapid as the blood circulation ceases and many errors of the past are doubtless due to this cause. To Dr. L. B. Bishop, I am specially indebted for use of his accurate manuscript notes on the "soft parts" of many North American species of his own collecting. Mr. H. Grönvold and Mr. Hartshorn have both assisted me in preparing the outline drawings of bills, a typical male of the species being selected in each case, although it has often been difficult to decide which was a typical specimen.

The question of measurements is an important one and it must not be forgotten in this connection that every collection contains a number of specimens that for some purposes are quite useless. If the birds are in the midst of the annual moult no exact measurements of wings or tails can be taken and the same difficulty is present at any time if wings, tails, bills, or legs are missing, greatly worn or broken. The "make" of a skin also has a bearing on wing measurements especially in birds which are long-winged like the gulls, for the wings may be folded quite differently by different collectors. Furthermore, allowance must be made, particularly in comparing wing-measurements, for different methods employed in measuring as well as for the personal equation. My methods are the ones quite generally accepted and the measurements given are at least safely comparable because all of them are personally taken. It may be well to state just how they are taken, even if this is a somewhat elementary matter.

WING.—Distance from the carpal joint ("bend of the wing") to tip of the longest primary of the left wing measured with a sliding rule like a shoemaker's. In some badly made skins both wings have been measured and an average struck; and the right wing is taken if the left is defective. It should not be forgotten that even in normal specimens the right and left wings often seem to differ a little in dimensions as they do in pattern. There is another way of measuring that increases the length

when the primaries are flattened down or measured along the outer feather instead of taking the chord as I have done. The difference is shown by the comparison of twenty specimens, ten large and ten small, that I have measured both ways: the ten large wings averaged 2.3% more and the ten smaller averaged 1.9% more when flattened.

TAIL.—Distance, measured with dividers, from the point where the skin joins the shaft of the left rectrix of the middle pair to the tip of the longest when the tail is closed naturally.

TARSUS.—Distance, measured with dividers, on the anterior aspect from the tibio-tarsal joint to base of the middle toe.

TOE.—Length of middle digit, measured with dividers, from junction of the tarsus to the point where the nail and the skin meet.

BILL.—Length of culmen is the chord, measured with dividers, from base at apex of the angle of the frontal feathering to the tip; depth at base is the vertical distance measured between the parallel jaws of a sliding rule applied just anterior to the frontal feathering; depth at angle of gonys similarly taken at right angles to the axis of the bill. It should be noted that this depth may be diminished either by a less prominent angle or by a rapidly sloping or decurved maxilla. Stout bills generally have prominent angles which flatten out the more slender the bill becomes.

In the descriptions which follow the usual ornithological terms are employed, but there are several convenient terms applicable chiefly to gulls or to gulls alone that perhaps require brief explanation.

MANTLE is a term that applies to the area of gray or dark color that, like a cloak thrown over the bird, envelops, in the adult, the back and adjacent surface of the wings, excepting the primaries, their coverts, the secondaries and alula, although in some cases they too blend in color with the mantle.

MIRROR is a rounded white spot often found on the inner web subapically of the outer (or tenth) primary, sometimes extending to both webs; there may be also a second mirror in some species on the next or ninth and in a very few species on the eighth as well so that mirrors vary in number from one to three.

TONGUE (or primary-tongue) is an elongated area of gray or white that extends variable distances from the bases of the primaries, usually on the inner webs, sometimes on both. It is a more comprehensive term than "wedge," a word that has been used for much the same purpose.

EYE-CRESCENT is the black or dusky area found at the anterior canthus of the eye, and it generally sweeps backward above and below the eye next the eye-ring. It is formed in most cases by dark hair-like tips of the feathers.

EYELID (or orbital ring) is the fleshy margin of the eye.

EYE-RING is the ring of feathers growing next the eyelids.

KEY TO GENERA

- a.*—Nostril ovate; depth of bill at angle equals half length of culmen. *Gabianus*.
- aa.*—Nostril ovate-acuminate (linear-oval if bill is slender); depth of bill at angle less than half length of culmen.
 - b.*—Hind-toe rudimentary (often lacking claw); tarsus shorter than middle toe without claw. *Rissa*.

bb.—Hind-toe normal; tarsus longer than middle toe without claw.

c.—Tail uneven.

d.—Tail forked.

e.—Bill large (over 45 mm.) and tapering, decurved at tip.

Creagrus.

ee.—Bill very small (under 20 mm.) *Xema.*

dd.—Tail wedge-shaped. *Rhodostethia.*

cc.—Tail even or rounded.

d.—Legs and feet much roughened; tibia feathered nearly to tarsus, whole plumage white in adult (slight black spotting in young) *Pagophila.*

dd.—Legs and feet smooth to rough, tibia about two-thirds feathered.

e.—Bill blunt, medium-sized, angle deep; gonys short and straight. *Leucophæus.*

ee.—Bill more slender, less blunt; gonys usually curved (or straight if bill is long.)

f.—Size large (wing usually much over 350 mm.), bill large and stout, angle prominent, primaries black or black and white (rarely gray) with rounded mirrors, apical spots and gray (sometimes white) tongues, head usually white in summer, streaked in winter.

Larus.

ff.—Size small (wing usually under 350 mm.), bill slender, medium to small in size, angle flattened or obscure, primaries black with white on inner or both webs (sometimes with squarish mirrors), head usually hooded in summer, white partly dusky in winter.

Hydrocolæus.

KEY TO SPECIES OF THE GENUS *Larus*

a.—Tail entirely white.

b.—Primaries black; size medium (wing under 350 mm.).

c.—Bill stouter, black-banded at nostrils. *hemprichi.*

cc.—Bill slenderer, black-banded at tip. *leucophthalmus.*

bb.—Primaries patterned; size large to medium (wing over 350 mm.).

c.—Primaries gray with white pattern or wholly white.

d.—Primaries pale gray paling to terminal white, shafts yellowish.

e.—Large (wing over 430 mm.) *hyperboreus.*

ee.—Small (wing under 430 mm.) *leucopterus.*

dd.—Primaries darker gray with white mirrors and tongues, shafts brownish. *glaucescens.*

cc.—Primaries black with white mirrors and gray or white tongues.

d.—Bill banded with black.

e.—One small mirror on outer primary. *audouini.*

ee.—Large mirrors or white spaces on two outer primaries.

f.—Head hooded or partly hooded, size very large (wing over 425 mm.) *ichthyaëtus.*

ff.—Head white or streaked, small (wing under 390 mm.).

- g.*—Bill completely banded.....*delawarensis*.
gg.—Bill partly banded.....*californicus*.
dd.—Bill not banded.
e.—Bill plain greenish yellow, angle not prominent; medium size (wing under 385 mm., culmen usually under 40 mm.).....*canus*.
ee.—Bill yellow with large red spot in life at prominent angle; large size (wing usually over 400 mm., culmen over 40.).
f.—Three outer primaries black with conspicuous gray or white tongues, two mirrors; mantle paler, gray.
g.—Size smaller (wing under 370 mm.) mantle darker gray, bill with dark mark or partial band near angle; tarsus (in life) greenish yellow.
californicus.
gg.—Size larger (wing over 380 mm.), bill unmarked mantle paler gray.
h.—Primary tongues gray; tarsus in life flesh-color.....*argentatus*.
hh.—Primary tongues largely white; tarsus in life yellow.....*cachinnans*.
ff.—Three outer primaries largely black, the rest with tongues diminished, dusky or absent; one mirror or two: mantle darker, slaty or black.
g.—Size very large (wing over 410 mm.), with two mirrors or much terminal white.
h.—Mantle blacker; larger (culmen over 55 mm.)
marinus.
hh.—Mantle grayer; smaller (culmen under 55 mm.)
schistisagus.
gg.—Size smaller (under 410 mm.), with one mirror.
h.—Bill and tarsus large and stout (culmen less than three times depth at base); the latter (in life) never yellow.
i.—Mantle black, tarsus (in life) lead-color.
dominicanus.
ii.—Mantle gray, tarsus (in life) flesh-color.
occidentalis.
hh.—Bill and tarsus usually more slender (culmen more than three times depth at base); tarsus (in life) yellow.....*fuscus*.
aa.—Tail not entirely white.
b.—Tail uniform in color tipped with buff or white.
c.—Tail gray.....*fuliginosus*.
cc.—Tail black or brown.
d.—Tail broadly tipped with white.....*heermanni*.
dd.—Tail narrowly tipped with buff.
e.—Plumage wholly brown with buff edgings.

- f.*—Bill stout (culmen three times depth of bill).
g.—Bill brownish at base, tarsus slender. *heermanni* juv.
gg.—Bill black, tarsus stout. *fuliginosus* juv.
ff.—Bill slender (culmen four times depth), black.
modestus juv.
ee.—Plumage partly brown, lower parts largely white.
crassirostris juv.
- bb.*—Tail patterned.
c.—Tail banded with black or brown.
d.—Tail gray and banded.
e.—Bill (culmen four times depth) and tarsus slender. *modestus*.
ee.—Bill (culmen three times depth) and tarsus stout.
fuliginosus 2nd year.
dd.—Tail white and banded.
e.—Band distinct.
f.—Mantle gray.
g.—Size small (wing under 380 mm.) . . . *crassirostris*.
gg.—Size large (wing over 420 mm.).
ichthyaëtus 2nd and 3rd years.
ff.—Mantle slaty black. *belcheri*.
ee.—Band blurred or partial and indistinct.
f.—Plumage plain brown.
g.—Middle rectrices dark to base. *leucophthalmus* juv.
gg.—Middle rectrices gray or white at base.
hemprichi juv.
ff.—Plumage coarsely mottled.
g.—Wing-band at tips of secondaries gray; throat spotted. *delawarensis* juv.
gg.—Wing-band brown; throat plain brown. *canus* juv.
cc.—Tail freckled, spotted, barred, blotched or smudged with dusky brown (sometimes obscurely banded).
d.—Tail patterned with gray or drab and white.
e.—Tone of plumage paler gray, tail mottled.
f.—Size larger (wing over 430 mm.)
hyperboreus juv., 2nd and 3rd years.
ff.—Size smaller (wing over 430 mm.)
leucopterus juv., 2nd and 3rd years.
ee.—Tone of plumage darker gray, tail gray or white spotted or blotched. *glaucescens* juv., 2nd and 3rd years.
dd.—Tail patterned with brown or black and white.
e.—Tail dark with white pattern.
f.—Barring, fine speckling or blurring predominant, the dusky area usually exceeding the white.
g.—Larger (wing averaging over 400 mm.), bill black or indistinct band at tip.
h.—Tail much barred, bill smaller.
i.—Head dark, heavily streaked.
argentatus juv.

- ii.—Head white, lightly streaked.
dominicanus 2nd and 3rd years.
- hh.—Tail slightly barred, bill larger.
occidentalis juv.
- gg.—Smaller (wing averaging under 400), bill with
decided black band.....*californicus* juv.
- ff.—Coarse spotting predominant, obscurely banded, the
white area usually largely exceeding the dusky.
- g.—Distinct drab-gray wing-band at ends of sec-
ondaries.....*schistisagus* juv.
- gg.—Indistinct mottling at ends of secondaries.
- h.—Tone paler, much buff or white in plumage,
head white, lightly streaked.
- i.—Tail very coarsely patterned, size very
large (wing over 450 mm.).
marinus juv.
- ii.—Tail less coarsely patterned, size smaller
(wing under 450 mm.).
- j.—Size large (wing over 410 mm.).
cachinnans juv.
- jj.—Size small (wing under 400 mm.).
audouini juv.
- hh.—Tone darker, head dusky and heavily
streaked.
- i.—Bill blunter and stouter, culmen less
than three times depth at base.
dominicanus juv.
- ii.—Bill usually more slender, culmen more
than three times depth at base.
fuscus juv.
- ee.—Tail white with dusky blotches, smudges or a partial band.
- f.—Mantle partly or wholly pale gray, primaries usually
with gray or white tongues; outer, sometimes with
a mirror (often blurred), bill usually partly banded.
- g.—Size small (wing under 390 mm.).
- h.—Mantle and wing-band pale gray.
delawarensis 2nd and 3rd years.
- hh.—Mantle dark gray, wing-band brownish.
canus 2nd and 3rd years.
- gg.—Size large (wing over 390 mm.).
- h.—Mantle silvery or pearly gray.
- i.—Primary tongues gray.
- j.—Larger; wing-lining brown or white
with brown edgings.
argentatus 2nd and 3rd years.
- jj.—Smaller; wing-lining pale gray.
audouini 2nd and 3rd years.
- ii.—Primary tongues white.
cachinnans 2nd and 3rd years.

hh.—Mantle dark neutral gray.

i.—Bill stouter and larger (culmen less than three times depth), angle deeper, tip merely dusky or unmarked.

occidentalis 2nd and 3rd years.

ii.—Bill smaller (culmen three times depth), sharply black-banded.

californicus 2nd and 3rd years.

ff.—Mantle partly or wholly dusky gray or black, primaries with tongues inconspicuous (none on outer).

g.—Size large (wing over 450 mm.), bill large (culmen over 55 mm.)... *marinus* 2nd and 3rd years.

gg.—Size smaller (wing under 450 mm.), bill smaller (culmen under 55 mm.).

h.—Mantle slaty (sometimes brownish black).

i.—Bill slender (culmen more than three times depth), tarsus yellow (in life), usually slender.

fuscus 2nd and 3rd years.

ii.—Bill stout (culmen less than three times depth), tarsus flesh-color (in life), stouter. *schistisagus* 2nd and 3rd yrs.

hh.—Mantle black. *dominicanus* 2nd and 3rd yrs.

EXPLANATION OF ABBREVIATIONS USED

A. M. N. H.	= American Museum of Natural History collection
Brit. M.	= British Museum (Natural History) collection
B.-S.	= Brewster-Sanford collection
J. D.	= Jonathan Dwight collection
L. B. B.	= Louis B. Bishop collection
M. C. Z.	= Museum of Comparative Zoölogy collection
U. S. N. M.	= United States National Museum collection

DISCUSSION OF SPECIES

GABIANUS

Gabianus pacificus

Pacific Gull

Figures 1 to 6

Larus marinus LATHAM, 1790, 'Index Orn.,' II, p. 814.

Larus pacificus LATHAM, 1801, 'Index Orn.,' Suppl., p. lxviii.

Larus frontalis VIEILLOT, 1818, 'Nouv. Dict. d'Hist. Nat.,' XXI, p. 505.

Larus leucomelas VIEILLOT, 1818, 'Nouv. Dict. d'Hist. Nat.,' XXI, p. 509.

Larus bathyrinchus MACGILLIVRAY, 1824, Mem. Wern. Soc., V, p. 253.

Larus georgii KING, 1826, 'Surv. Intertrop. Coasts Australia,' II, p. 423.

DISTRIBUTION

Breeding range: some of the islands of Bass Strait, Spencer Gulf, King George Sound, and other localities on the southern coast of Australia; also Tasmania. In the non-breeding season frequenting the southern and eastern coasts and harbors, as far north as Rockhampton, Queensland, ascending the Murray and other Australian and Tasmanian rivers.

MEASUREMENTS

	MALES (4)	FEMALES (2)
Wing	420-448 (434.0)	420-420 (420.0)
Tail	171-187 (176.7)	169-173 (171.0)
Tarsus	71- 79 (73.7)	65- 67 (66.0)
Toe without claw	54- 58 (55.2)	53- 53 (53.0)
Culmen	54- 62 (57.8)	53- 54 (53.5)
Bill at base	22- 26 (23.7)	23- 23 (23.0)
Bill at angle	26- 30 (27.7)	26- 27 (26.5)

MOULTS AND PLUMAGES

Natal Down

REFERENCE SPECIMEN.—Brit. M.; November 14, 1904; Sandy Hook, West Australia.

BACK dull grayish white, mottled and lined rather obscurely with clove-brown. HEAD lighter, the spots sharper and darker. UNDERPARTS paler than the back, very indistinctly mottled posteriorly and having a few black linear spots on the sides of the chin. BILL bluish horn-color, tip light horn-color (Mathews, 1912-13). LEGS AND FEET black (M.). IRIS black (M.).

Downy young are not easily distinguishable from *argentatus* in like plumage, except that they appear to be darker in tone.

The breeding season extends apparently from September to January, being somewhat irregular.

Juvenal Plumage

Figures 1 and 2

REFERENCE SPECIMENS.—Brit. M.; January 1, 1897; Hobson's Bay, Victoria, Australia. M. C. Z., No. 13010; March, 1869; King George Sound, West Australia. J. H. Fleming, No. 25946; Tasmania.

BACK AND MANTLE-AREA uniform clove-brown, the feathers white at extreme base with a marbled subterminal zone and pale buffy edgings; rump and tail-coverts lighter brown and paler edged. HEAD AND NECK similar to the back but darker and more faintly edged; forehead and lores whitish. UNDERPARTS solidly clove or sooty brown with obscure paler edgings, the chin whiter with dusky spotting or streaking which becomes heavier (almost a band) on the upper throat; the feathers show much basal white. WINGS: primaries somewhat pointed and with their coverts and shafts

brownish or fuscous black, slightly paler towards base and on the inner webs, the inner five or six very slightly grayish buff at the tips; secondaries, tertials, and greater coverts pale clove-brown with paler edgings, slightly mottled; median and lesser coverts slightly browner with paler brown edgings; axillars, edge of wing and wing-lining brown similar to the underparts. TAIL brownish black very narrowly (1-5 mm.) buff tipped, sometimes the outer pair grayish white at base of the inner web at about 65 mm. from the tip, and with some white on the next pair, the others usually without any; (not resembling the *argentatus* group, with barred or spotted tails, but much like *leucophthalmus* and *hemprichi*); sometimes wholly black. BILL, in skin, largely dull black along commissure and beyond the nostril, merging toward the base into flesh-brown, having the effect of a terminal band. LEGS AND FEET, in skin, dark flesh-brown. IRIS probably dark brown.

First Winter or Non-nuptial Plumage

REFERENCE SPECIMEN.—M. C. Z., No. 12024; Melbourne, Australia.

Acquired by a partial postjuvenal moult apparently at its peak in December, or early January, plus wear of that part of the juvenal plumage which is retained.

BACK deep brown, very similar to the juvenal, but the mottling or marbling a trifle more fused and paler or grayer. HEAD, NECK, AND UNDERPARTS like the juvenal, perhaps a little paler, but new feathers look very dark when growing among the faded juvenal ones. WINGS AND TAIL of the juvenal plumage retained, faded and worn; also much of the posterior portion of the underparts. BILL AND OTHER SOFT PARTS like the juvenal.

First Nuptial Plumage

No specimen examined.

Doubtless acquired by a partial prenuptial moult taking place about August or later. The new feather growth of the head, neck and throat is probably little different from that of the first winter except in averaging whiter about the head and throat. The juvenal wings and tail are no doubt retained, the bill and other soft parts changing but little.

Second Winter or Non-nuptial Plumage

Figures 3 and 4

REFERENCE SPECIMENS.—M. C. Z., No. 27587; Australia. J. H. Fleming, No. 25947; Victoria, Australia.

Acquired by a complete postnuptial moult in December and January or later.

BACK AND MANTLE-AREA clove-brown with faint, pale edgings, mixed on the back with more or less brownish or slaty black; rump dull white, gray and brown-tinged; some of the tail-coverts with dusky areas on the outer webs next the shafts. HEAD AND NECK brown, but paler in tone than in the first winter, and whiter on fore-

head and lores, the whitish edgings producing a grizzled effect on the crown and nape, the neck browner. UNDERPARTS a paler brown than in the first winter, with more white on the streaked throat; a dull white crissum and under tail-coverts the latter often streaked; the throat, breast and abdominal area brown showing much basal white when displaced. WINGS: primaries darker than back, dull brownish black much like the juvenal but with rounded tips; wing-coverts and lining much like the juvenal, the greater coverts without obvious edgings. TAIL with two or three outer pairs of rectrices basally white somewhat dusky "fogged" or "peppered"; the narrow buffy white tipping varying in width; the more advanced birds have obscurely indicated broad black bands, basally "fogged." BILL, in skin, with a distinct broad black band at angle; base and extreme tip yellowish flesh. LEGS AND FEET, in skin, dusky flesh-brown. IRIS probably dark brown.

Second winter birds differ little in appearance from first winter. They usually show some slaty or blackish feathers on the back, however, and are paler in tone, whiter about the head, throat and tail, and may be distinguished by the rounded primaries. This last character is the only one that obtains in the backward birds which in other respects are the same as first winter specimens.

Second Nuptial Plumage

No specimen examined.

Doubtless acquired by a partial prenuptial moult, and probably differs little from the second winter, except that the new feathers of the head and breast are no doubt considerably whiter and the mantle has more black, or partly black feathers. The wings and tail of winter are retained and the bill probably has a diminished area of black.

Third Winter or Non-nuptial Plumage

REFERENCE SPECIMENS.—J. H. Fleming, No. 25948, Australia; still retains four old worn primaries and the second year tail.

Acquired by a complete postnuptial moult in December and January.

MANTLE fuscous or sooty black, with occasional traces of immaturity in brown markings, especially on the tertials. HEAD AND NECK white with dusky streakings and cloudings. UNDERPARTS white, or with occasional faint dusky cloudings, especially on the breast. WINGS: primaries deep black, from the fourth inward slightly paler and narrowly white-tipped; coverts, secondaries and tertials fuscous black, the tertials and scapulars with white tips. TAIL white, banded with black somewhat more broadly and with less sharply defined edges than in the adult. BILL, in skin, with some of the yellow of the adult but with a dusky band or partial band near tip; other soft parts, in skin, much like the second winter.

Third Nuptial Plumage

No specimen examined.

Doubtless acquired by a partial prenuptial moult, and the new plumage of the mantle, head, and throat is probably much like the third winter except that the head is white. Wings and tail of winter retained. Bill and other soft parts with some of the adult color.

Fourth Winter or Non-nuptial Plumage (Adult)

Figures 5 and 6

REFERENCE SPECIMENS.—M. C. Z., No. 75647 (no data); J. H. Fleming, No. 25945; Bass Strait, Tasmania; moulting and outer primary not grown.

Acquired by a complete postnuptial moult chiefly in December and January when adult plumage is usually assumed except in a very small percentage of backward birds that revert more or less to the third winter plumage.

MANTLE slaty to sooty black. HEAD AND NECK white with little if any dusky streaking. UNDERPARTS pure white often with a rosy tinge in fresh specimens. WINGS: primaries black with small white apical spots except on the outer two, the inner with paler webs; secondaries, black with broad white tips; coverts black; wing-lining white. TAIL white, with a subterminal black band (about 40–45 mm.) leaving a terminal white band of about 20 mm.; the outer pair of rectrices usually with a dark spot only on the inner web; but there seems to be considerable variation, and the outer pair may be banded or scarcely at all. BILL, in skin, yellow with a faded red spot at the angle. LEGS AND FEET “yellow” (*ex label*); in skin, yellowish brown. IRIS “white;” eyelids “yellow” (*ex labels*).

Fourth Nuptial Plumage (Adult)

REFERENCE SPECIMEN.—M. C. Z., No. 75647 (no data).

Acquired by a partial prenuptial moult, in August or September; wings and tail of winter retained. Differs very little from the fourth winter plumage, except that the head is white and the bill and soft parts acquire brighter colors.

BILL bright yellow, terminal third rose-red with edges of mandible dark slate, also green, tip red, cutting edges yellowish green (Mathews, 1912-1913). LEGS AND FEET ochre-yellow, pale olivaceous at joints (M.). IRIS ash-gray, also silvery white, eyelids scarlet (M.).

Mathews quotes colors from other observers and there are discrepancies that may be due to age. As no dates are given for the birds described, it is impossible for me to assign the descriptions to the exact stages of plumage. The “brown” iris of the “adult female” is, judged by analogous species, not that of an adult bird.

SUMMARY

A purely Australian species with a massive bill that marks it in any plumage. It is as if the angle had been stretched downwards by compressing the bill but the rounded nostril is even more characteristic so that there is good reason for placing the species in a monotypic genus. The large size, the yellow bill with a red spot in the adult, and the dark mantle and the yellow feet show an affinity to the true *Larus* group, while the dark primaries, banded tail, and the juvenal tail-pattern show an affinity to the *Adelarus* group.

I cannot speak definitely upon the validity of the proposed geographical race "*georgii*" from southwestern Australia. The only difference claimed is a narrower tail-band (20 mm. instead of 40 mm.) and I think that this may possibly be due to age rather than geography, as there is great individual variation in other species with tail-bands.

The limited number of specimens examined, many of them with insufficient data, has obliged me to be somewhat incomplete in my study of the species, for no accurate results can be obtained without exact data which are now lacking in much of the available material.

LEUCOPHÆUS

Leucophæus scoresbii

Scoresby's Gull

Figures 7 to 12

Larus scoresbii TRAILL, 1823, Mem. Wern. Soc., IV, p. 514.

Larus hæmatorhynchus VIGORS, 1828, Zool. Journ., IV, p. 103.

Procellarus neglectus BONAPARTE, 1854, Naumannia, pp. 211, 213.

DISTRIBUTION

Breeding range: the South Shetlands, Falklands, Tierra del Fuego, Hoste and other islands at or near Cape Horn. In the non-breeding season north, on the coast of Chile to Ancud, and of Argentina to Rio Gallegos.

MEASUREMENTS

	MALES (18)	FEMALES (18)
Wing	316-339 (328.1)	306-327 (319.2)
Tail	129-142 (135.9)	126-136 (131.3)
Tarsus	47- 54 (50.8)	45- 55 (48.6)
Toe without claw	40- 45 (43.1)	38- 46 (41.1)
Culmen	35- 42 (39.5)	34- 41 (37.2)
Bill at base	13- 16 (15.1)	12- 16 (13.9)
Bill at angle	15- 17 (16.2)	14- 17 (15.1)

MOULTS AND PLUMAGES

NATAL DOWN

REFERENCE SPECIMENS.—Brit. M. (Saunders, No. 3529); January 27, 1881; Falkland Islands. No. 3530 same data; partly in juvenal plumage.

BACK grayish, rather indistinctly mottled or lined with clove-brown. HEAD similar, but clearly spotted. UNDERPARTS grayish, darker on the throat, with much finer speckling posteriorly; dusky spots on the sides of the head and on the jugulum. BILL, LEGS, AND FEET, in skin, brownish dusky flesh. IRIS probably dark brown.

Juvenal Plumage

Figures 7 and 8

REFERENCE SPECIMENS.—B.-S., No. 2517; ♀; April 20, 1914; Ancud, Chile. B.-S., No. 2376; ♂; May 1, 1915; Beagle Channel, Chile.

BACK AND MANTLE-AREA uniform rich sepia-tinged hair-brown, the feathers basally grayish white and practically without edgings, the shafts basally pale in contrast; rump brownish gray; upper tail-coverts yellowish white. HEAD AND NECK and sides of throat paler brown; a pale grayish partial eye-ring and a dusky eye-crescent both inconspicuous. UNDERPARTS, chin to lower breast and sides paler brown than the back, but somewhat spotty or streaky owing to the white shafts and dark subterminal areas; lower breast, flanks, abdomen and crissum paling to white. WINGS: primaries and their coverts dull brownish black, the fourth primary usually boldly white-tipped and sometimes with a very small mirror (about 10 mm.) on the inner web, third to first with broad (20 mm.) white tips, especially on inner webs; secondaries and tertials grayer but all broadly (about 15 mm.) tipped; the other coverts and the alula browner, very faintly buff-tipped; wing-lining grayish clove-brown, edge of wing whiter with brown clouding. TAIL white with black or brown shafts and a broad (about 25 mm.) dull black subterminal band usually just smudging the two outer pairs of rectrices which are white with only a small dusky spot on the inner webs and seldom entirely white. The bands in fourteen specimens measure 18–44 (25.8) mm. BILL “brownish flesh, tip black” (*ex label*); in skin, yellowish brown at base, the black and the flesh fusing at about the middle of the nostril and on the lower mandible obliquely to the angle. LEGS AND FEET “brownish flesh” (*ex label*); in skin, dusky brown. IRIS “brown” (*ex label*).

First Winter or Non-nuptial Plumage

REFERENCE SPECIMENS.—B.-S., No. 3375; ♀; July 29, 1915; Beagle Channel, Argentina. B.-S., No. 3393; ♂; April 13, 1915; False Cape Horn, Chile; in moult.

Acquired by a partial postjuvenal moult in April, May, June, and not completed even by July 19 (B.-S., No. 3244; ♂; Ushuaia) in Tierra del Fuego.

BACK slaty brown becoming paler anteriorly and blending gradually into the much paler gray of the neck which is sharply set off from the dark hood. HEAD with a dark slaty gray hood, paler on the forehead and lores; eye-ring whitish gray. UNDERPARTS largely grayish white, the breast grayer with a dusky gray indistinct jugular band set off abruptly from the white throat and chin which are flecked with similar or darker gray. WINGS AND TAIL of juvenal plumage retained, often much worn and faded. BILL AND SOFT PARTS like the juvenal.

First Nuptial Plumage

REFERENCE SPECIMENS.—B.-S., No. 4282; ♂; November 17, 1915; Falkland Islands. B. S., No. 4279; ♀; same data.

Acquired by a partial prenuptial moult in Chile in October and November, earlier in the Falkland Islands; wings and tail of juvenal plumage retained.

BACK largely slaty brown. HEAD pale gray in place of dark winter hood; neck a pale gray. UNDERPARTS mostly grayish white, chin decidedly white, sometimes flecked with slaty. BILL "flesh, tip dark" (*ex* label); in skins, obscurely dusky beyond the angle, basally flesh-brown. LEGS AND FEET "sooty" (*ex* label); in skin, dusky brown. IRIS "grayish" (*ex* label).

Second Winter or Non-nuptial Plumage

Figure 9

REFERENCE SPECIMENS.—J. D., No. 52422; ♂; May 22, 1915; Beagle Channel, Argentina; in fresh plumage. B.-S., No. 2515, ♂; Ancud, Chile; outer primaries just sprouting and tail half grown. B.-S., No. 4279; ♀; November 17, 1915; Kidney I., Falklands; two inner primaries of second winter just showing, old juvenal banded tail.

Acquired by a complete postnuptial moult in April and May, but earlier (November) in the Falkland Islands.

MANTLE deep mouse-gray. HEAD with a dusky slaty hood extending into eye-crescent; the forehead whitish, lores and sides whitish with spotting or streaking; partial eye-ring white. UNDERPARTS pale gray; chin and upper throat white, sometimes flecked with slate. WINGS: three outer primaries black, the rest with white tips increasing inwards, the fourth to the first also white along the inner web for about 30 mm. and a small white spot on fifth. TAIL white, sometimes with dark shaft-streaks. BILL "flesh, tip blackish" (*ex* label); in skin brownish flesh with a dusky band beyond the angle or sometimes quite reddish and the band reduced to dusky spots. LEGS AND FEET "brownish" (*ex* label); in skins, dusky brown. IRIS "brown" (*ex* label).

It is probable, judging by the size of this gull, that some of them perhaps may acquire fully adult plumage at this moult. It therefore has either a two-year or a three-year cycle, probably the latter.

Second Nuptial Plumage

REFERENCE SPECIMENS.—J. D., No. 52423; ♂; December 17, 1914; Hoste Island, Chile. B.-S., No. 3408; ♂; and No. 3404; ♀; same data.

Acquired by a partial prenuptial moult chiefly in September and October, some December birds still showing remains of the dark hood and others, with new gray feathers growing on the head, as early as July (B.-S., No. 3389; ♀; July 31, 1915; Gable I., Beagle Channel).

MANTLE like the second winter, but a clear gray head and neck replaces the dark hood. Wings and tail of winter retained. The bill, legs, and feet begin to show color (a dull crimson), even in skins, the iris whitish.

Third Winter or Non-nuptial Plumage (Adult)

Figures 10 to 12

REFERENCE SPECIMENS.—B.-S., No. 4280; January 6, 1916; Falkland Islands; still retaining four old primaries and all of the old tail of the second winter, but new back, hood, neck and lower parts.

Acquired by a complete postnuptial moult in January and February in the Falkland Islands, and as late as April and May at Cape Horn when full adult plumage is attained.

MANTLE slaty black. HEAD with dusky gray hood reaching only to sides of throat; neck, paler gray, merging into darker back; eye-ring half white posteriorly. UNDERPARTS pale gray, nearly white on chin, upper throat and crissum. WINGS: primaries black, with apical spots except on two outer, the fourth to first much more broadly white-tipped, a very small spot on inner web of the fourth; secondaries grayer, very broadly white-tipped forming a wing-band (25–40 mm.); wing-lining deep gray. TAIL white, shafts white. BILL “red” (*ex* label); in skin, a bright carmine red, more vivid than in second winter. LEGS AND FEET “red” (*ex* label); in skin, yellowish brown with strong red tinge. IRIS “whitish gray”; eyelids, “reddish” (*ex* labels).

Third Nuptial Plumage (Adult)

REFERENCE SPECIMENS.—J. D., No. 52423; ♂; December 17, 1914; Hoste Island, Chile; also a large number of other breeding birds.

Acquired by a partial prenuptial moult in June and July in the Falklands, and in September and October at Cape Horn; winter wings and tail retained.

Like the winter except that a pale gray head, uniform with neck, replaces the dusky winter hood; eye-ring white in contrast to the adjacent pale pearly gray. BILL “red” (*ex* label); in skin, carmine, the color long persisting. LEGS AND FEET “red” (*ex* label); in, skin yellowish red, in time becoming a dusky flesh-brown. IRIS “white”; “eyelids red” (*ex* label).

SUMMARY

An Antarctic species deservedly placed in the monotypic genus *Leucophæus* because of the peculiar blunted bill (due to the straight gonys and rather abruptly decurved upper mandible) that marks it in every plumage. The adult, a soft gray with a nearly black mantle and a rosy carmine bill must be a remarkably beautiful gull in life. It shows in the black slightly patterned primaries and gray plumage probable affinity to the *Adelarus* group.

PAGOPHILA

Pagophila alba

Ivory Gull

Figures 13 to 18

Larus albus GUNNERUS, 1767, in Leem's 'Beskr. Finm. Lapper.,' p. 285 (northern Norway).

Larus eburneus PHIPPS, 1774, 'Voy. North Pole,' App., p. 187.

Larus candidus MÜLLER, 1776, 'Prodr. Zool. Danm.,' p. viii.

Larus niveus BODDAERT, 1783, 'Tab. Pl. Enl.,' p. 58.

Larus cyanorhynchus TEMMINCK, 1807, 'Cat. Syst.,' pp. 186, 187.

Larus brachytarsus HÖLBOLL, 1846, 'Fauna Grönl.,' p. 52.

DISTRIBUTION

Circumpolar, breeding far north of the Arctic Circle; localities in the New World, Mackenzie (Darnley Bay), Prince Patrick Island, Melville Island, Ellesmere Land, Grinnell Land, Greenland (Thank God Harbor), Baffinland (Port Bowen); in the Old World, Franz Joseph Land, Spitzbergen, Nova Zembla, and islands of the Siberian coast (Polynia Islands, Bennett Island, Herald Island), but not Iceland nor Jan Mayen Island. In winter south to the northern coasts of Asia, Europe and North America; reaching Kamchatka (Commander Islands), the White and Baltic Seas, the British Isles, Iceland, Labrador, Hudson Bay, Alaska and the Aleutian Islands, casual south to France, Denmark and Switzerland and to British Columbia, Ontario, Quebec, New Brunswick, Nova Scotia, Maine, Massachusetts and New York (Long Island).

MEASUREMENTS

	MALES (14)	FEMALES (6)
Wing	328-346 (338.0)	320-340 (329.2)
Tail	141-160 (148.3)	135-146 (140.7)
Tarsus	37- 42 (39.6)	35- 39 (36.6)
Toe without claw	32- 37 (34.8)	32- 37 (33.3)
Culmen	33- 38 (35.9)	32- 37 (33.5)
Bill at base	11.5- 14 (12.9)	11.5- 13 (12.1)
Bill at angle	11- 13 (12.1)	10- 12 (10.9)

MOULTS AND PLUMAGES

Natal Down

REFERENCE SPECIMENS.—L. B. B., No. 24479; August 3, 1901; King Charles Land, Spitzbergen. Tring Museum, August 3, 1901, Spitzbergen, (two specimens).

BACK AND HEAD a bluish deep neutral gray resembling the fur of a blue fox, darker posteriorly, unmarked, the down filaments yellowish at the tips giving a slightly yellowish cast especially about the head. UNDERPARTS paler, unmarked. BILL, in skin, chiefly dusky, pale brownish flesh at the base and at the extreme tip. LEGS AND FEET, in skin, black. IRIS "brown" (*ex* label).

Juvenal Plumage

Figures 13 to 16

REFERENCE SPECIMENS.—J. D., No. 14161; ♀; November 2, 1898; Holstenborg, Greenland. J. D., No. 24381; ♂; November 29, 1905, Godhaab, Greenland.

BACK AND MANTLE-AREA white, very sparsely flecked with brownish black or clove-brown, the irregular bars or spots subterminal, widest on scapulars, not over 5–8 mm.; rump white, upper tail coverts with terminal faint dusky shaft streaks. HEAD AND NECK white, a few flecks and dusky smudging on forehead, postocular, loreal and malar regions, the dusky-tipped feathers basally white; eye-ring and eye-crescent black. UNDERPARTS white, the chin alone dusky spotted or smudged, spots rare elsewhere. WINGS: primaries pointed, chiefly white with subterminal dusky bands, shafts faintly yellow, the coverts and alula rather narrowly tipped with brownish black, secondaries with slight dusky terminal shaft streaks; tertials, and greater coverts with heavier spotting; median and lesser coverts more finely spotted and streaked; and border of wing heavily flecked; lining and axillars white. TAIL white with dull black narrow subterminal band, V-shaped on each feather (about 10–15 mm.) varying in width, the outer rectrix sometimes with only a dusky spot; the terminal white edging very narrow. BILL, in skin, dull black with brownish flesh areas chiefly beyond the nostril. LEGS AND FEET “black” (*ex label*); in skin, duller, brownish. IRIS “brown” (*ex label*).

First Winter or Non-nuptial Plumage

REFERENCE SPECIMEN.—J. D., No. 24380; ♂; November 20, 1905; Sukkertoppen, Greenland.

Acquired by a partial postjuvenal moult in August and September.

BACK pure white occasionally flecked. HEAD usually less dusky than in juvenal plumage. WINGS AND TAIL of juvenal plumage retained. BILL AND OTHER SOFT PARTS like the juvenal.

First Nuptial Plumage

REFERENCE SPECIMEN.—J. D., No. 14160; ♀; March 2, 1898; Holstenborg, Greenland; still largely in juvenal plumage, but moulting.

Acquired by a partial prenuptial moult in March and April. Very like the first winter but there is new growth of the head, throat and back, with less flecking; the juvenal wings and tail are retained. Bill and soft parts much like the juvenal.

Second Winter or Non-nuptial Plumage (Adult)

Figures 17 and 18

REFERENCE SPECIMENS.—J. D., No. 24379; ♀; July 6, 1900; Spitzbergen; one old dusky tipped primary, the rest new white, two old primary coverts, the old alula and edge of wing with dusky tipped feathers.

Acquired by a complete postnuptial moult in July and August; the entire plumage is now regularly wholly ivory-white, and the shafts of the quills of wings and tail pale straw-yellow; occasional specimens

show a few dusky fleckings on the new feathers. Primaries rounded and rectrices squarer than in the juvenal plumage.

BILL, in skin, basal two-thirds greenish and dusky, tip and along tomia pale yellowish flesh-brown. LEGS AND FEET, in skin, brownish black. IRIS "dark brown; eyelids yellow to orange" (ex label).

It is unusual for a gull of this size to attain adult plumage before the third winter, but this species has so few markings when young that they seem to be lost at the first postnuptial moult. Therefore, the species, in spite of its fairly large size, seems to have a two-year plumage-cycle.

Second Nuptial Plumage (Adult)

REFERENCE SPECIMEN.—J. D., No. 14159; ♀; July 3, 1901; Spitzbergen.

Acquired by a partial prenuptial moult in March and April not including wings or tail.

Plumage wholly white, not different from the second winter. BILL, base greenish brown or slate-blue, rest yellowish, tip yellowish red (Witherby). LEGS AND FEET black (W.). IRIS black-brown; eyelids vermilion (W.).

SUMMARY

Although *Pagophila alba* has for good reason been placed in a monotypic genus, the characters are more or less relative and shared by other species. The roughening of the tarsus and feet is very nearly equalled by *Larus fuliginosus*, and the deep incisure of the webs of the feet is occasionally equalled by several of the other gulls. The very short bare portion of the tibia and especially the ivory-white plumage are more distinctive characters. The bill is, like that of *Larus canus*, without a red spot; and the banded tail of the first year shows an affinity to gulls of the smaller species (*Hydrocolæus*). The bill often shows basally a shedding or moult of the corneous covering and resembles in some cases that of the Jaegers which have a distinct "nail." The black claws are strong and sharp, but relatively not more so than in some of the other smaller species.

LARUS

Subgenus ADELARUS

Larus fuliginosus

Dusky Gull

Figures 19 to 24

Larus fuliginosus GOULD, 1841, 'Zool. "Beagle,"' III, p. 141 (St. James Island, Galapagos Islands).

Larus neptunus BONAPARTE, 1857, 'Consp. Av.,' II, p. 232.

Larus belcheri BLASIUS, 1865, Journ. für Orn., p. 378, part.

DISTRIBUTION

Resident on the Galapagos Islands, breeding on some and wandering to others after the breeding season.

MEASUREMENTS

	MALES (10)	FEMALES (8)
Wing	330-352 (345.4)	332-344 (337.0)
Tail	140-151 (146.3)	132-141 (136.5)
Tarsus	53- 58 (55.9)	52- 55 (53.4)
Toe without claw	41- 45 (43.5)	39- 42 (40.4)
Culmen	41- 45 (43.5)	40- 42 (41.0)
Bill at base	13-14.5 (13.5)	11.5-13 (12.4)
Bill at angle	13.5-14.5 (14.0)	12-13.5 (12.8)

MOULTS AND PLUMAGES

Natal Down

No specimen seen.

Juvenal Plumage

Figures 19 and 20

REFERENCE SPECIMEN.—Brit. M., 91.5.22.2; ♀; August 25; Indefatigable Island, Galapagos Islands; much worn specimen. The breeding season is extremely variable, seemingly covering most of the year.

BACK AND MANTLE-AREA dark sooty brown with somewhat paler edgings, rump and tail-coverts similar but paler. HEAD darker, shading on the nape into the back; eye-crescent black; eye-ring gray. UNDERPARTS grayer, paler brown, chin and abdomen palest, with faint edgings; under tail-coverts obscurely barred or spotted. WINGS: primaries brownish black, even the inner scarcely paler at the tips, shafts dusky; secondaries and tertials also dull black with narrow whitish-gray tips; coverts, including the greater, like the back. TAIL brownish black, basally often slightly whitish. BILL black (Gifford). LEGS AND FEET black (G.); in skin, black. IRIS probably brown; eyelids black (G.).

First Winter or Non-nuptial Plumage

REFERENCE SPECIMEN.—Above specimen partly in this plumage.

Acquired by a partial postjuvenal moult which is irregular in point of time, extending apparently chiefly from August to April.

BACK slaty instead of the brown of the juvenal plumage; rump and tail coverts grayer. HEAD dusky gray or sooty brown, much darker than the grayer back, into which it blends. UNDERPARTS sooty brown, grayer than the juvenal on throat, breast and tail coverts. WINGS AND TAIL of the juvenal plumage retained. BILL AND SOFT PARTS like the juvenal.

First Nuptial Plumage

REFERENCE SPECIMEN.—M. C. Z., No. 65677; June 25, 1891; Chatham Island; specimen much worn.

Acquired by a partial prenuptial moult at irregular times chiefly from September to December; the winter wings and tail retained. This produces a plumage similar to the winter, rather slatier about the head and throat, the bill and soft parts unchanged.

Second Winter or Non-nuptial Plumage

Figures 21 and 22

REFERENCE SPECIMENS.—A. M. N. H., No. 61537; ♀; April 5, 1887; Chatham Island; at end of moult, the outer primaries not grown. Brit. M., 99.9.1.621; ♀; November 10, 1897; Albermarle Island; four old primaries remaining.

Acquired by a complete postnuptial moult in April, May and June, often extended to the fall months.

MANTLE slaty gray sometimes with a brown tinge; rump paler gray. HEAD AND NECK sooty brown paler and rather grayer on the forehead; indistinctly hooded with brownish black; eye-crescent black; eye-ring grayish. UNDERPARTS, chin, and upper breast pale sooty brown merging into grayer lower breast and sides, and pale lighter plumbeous gray on the abdomen, the under and upper tail-coverts the palest. WINGS: primaries like the juvenal, the shafts dusky, but from about the fifth to the first and all the secondaries gray-tipped; primary coverts like the juvenal; wing-lining grayer than juvenal; tertials gray with whitish gray tips. TAIL gray, smudged or partially banded rather broadly in variable degree, subterminally with dull black; upper and under coverts pale gray. BILL, LEGS, AND FEET "blackish" (*ex label*); in skin, black, no red spot at extreme tip of the bill as in adult.

It is difficult to determine if there be any peak to the moult for the species seems to breed throughout the year. However, each colony no doubt has its peak at the close of the breeding season. It is possible that some (perhaps many) birds become adult at this moult, although the species seems to have a three-year plumage-cycle.

One specimen examined has the new middle pair of rectrices about 12 mm. longer than the others, a condition that also is found occasionally in other species.

Second Nuptial Plumage

REFERENCE SPECIMENS.—Brit. M., 99.9.1.618; ♂; October 8, 1897; Barrington Island.

Acquired by a partial prenuptial moult that apparently may occur at any time from April to November.

Differs very little from the second winter, rather grayer and retaining the wings and tail of winter.

Third Winter or Non-nuptial Plumage (Adult)

Figures 23 and 24

REFERENCE SPECIMENS.—Brit. M. (Saunders, No. 3393); August 24, 1868; Indefatigable Island; new outer primary not fully grown. M. C. Z., No. 57964;

♀; March 27, 1901; Narborough Island; two old primaries remaining in right wing and three in left.

Acquired by a complete postnuptial moult irregular in time varying from March to August.

MANTLE deep mouse-gray; rump paler. HEAD with a dark sooty brown sometimes grayer hood, which extends to the chin, set off from the gray of the hind neck and of the throat, eye-ring posteriorly whitish gray; obscure eye-crescent, black. UNDERPARTS: chin brown in contrast to the gray throat and sides, which pales on the breast and abdomen, the crissum becoming rather abruptly nearly white. WINGS: primaries black, but shafts yellowish white, the inner with gray inconspicuous apical spots. TAIL clear pale gray, the middle pairs of rectrices darker and as dark as the mantle, the outer pairs nearly white; upper coverts pale gray, under coverts paler. BILL, in skin and in life (*ex* label), black, with a small red spot at extreme tip on the anterior slope; or dark bay shading into black near tip and tip of maxilla burnt sienna. (Gifford). LEGS AND FEET "black" (*ex* label); or dark prune-purple (G.); in skin, black. IRIS lemon [on November 10]; eyelids dark crimson (G.); in skin, black.

Third Nuptial Plumage (Adult)

REFERENCE SPECIMEN:—Brit. M., 99.9.1.620; ♀; November 10, 1897; Albemarle Island.

Acquired by a partial prenuptial moult apparently from April to November; the wings and tail of winter retained.

Differs little from winter, the eye-ring whiter. Bill becomes reddened somewhat, the eyelid and spot at tip of bill brighter red than in winter.

The periods of moult are very irregular and difficult to fix. The usual peak of the breeding season seems to be October and November, but it is probable the different islands of the group have different peaks.

SUMMARY

Larus fuliginosus is a local equatorial species of the Galapagos Archipelago. It is characterized by uniformly dusky grayish or deep brown plumage including dusky wings in both young and old; the bill is larine and together with the feet black; the size is medium, the tail gray in the adult, banded throughout the first year, and often partly so during the second.

In general coloration and size it is most nearly related to *modestus* which, however, has a slenderer bill and tarsus and a banded tail even when adult, and to *heermanni* which has a black tail merely white-tipped, a bright red bill banded at the tip, and a white head in the breeding season. These three species have some characters in common but their superficial resemblance in color is scarcely a sufficient reason for placing

them, as has been done, in a separate genus (*Blasipus*). I have assigned them, together with several other closely allied species (*leucophthalmus*, *hemprichi*, *belcheri* and *crassirostris*), to the subgenus *Adelarus*.

Larus modestus

Gray Gull

Figures 25 to 30

Larus modestus TSCHUDI, 1843, Wiegman, Arch. für Naturg., part 1, p. 389 (Peru).

Larus fuliginosus GRAY, 1844, 'List Birds Brit. Mus.,' 'Anseres,' p. 170.

Larus bridgesi FRASER, 1845, Proc. Zoöl. Soc. London, p. 16.

Larus polios BONAPARTE, 1885, Rev. Zool., p. 21.

DISTRIBUTION

Resident on the coasts of Chile and Peru, breeding on some of the islands from Corral (Cautin, Lat. 40° S.) to the Chincha Islands (Lat. 14° S.) and Ancon, Pisco Bay; wandering after the breeding season and found as far north as the Gulf of Guayaquil.

MEASUREMENTS

	MALES (5)	FEMALES (14)
Wing	314-337 (329.2)	299-328 (318.7)
Tail	117-131 (124.0)	116-122 (119.6)
Tarsus	48- 55 (53.2)	46- 51 (48.7)
Toe without claw	34- 41 (38.2)	33- 37 (34.6)
Culmen	40- 43 (41.8)	37- 41 (39.6)
Bill at base	10.5- 12 (10.9)	9- 11 (10.0)
Bill at angle	10.5- 12 (11.1)	9- 11 (10.2)

MOULTS AND PLUMAGES

Natal Down

No specimen examined.

Juvenal Plumage

Figures 25 and 26

REFERENCE SPECIMENS.—B.-S., No. 520; ♂; April 24, 1913; Ancon, Peru; others May 5-19, worn but showing much of the first winter plumage.

BACK AND MANTLE-AREA, rump and upper tail-coverts pale clove-brown edged rather broadly with grayish buff. HEAD AND NECK similar but edgings much narrower. UNDERPARTS similar to back, paler, much less conspicuously edged and with broad pinkish buff edgings on under tail-coverts. WINGS brownish black including primaries, their coverts and shafts, the alula, and the secondaries, the latter with pale grayish tips, the rest of wing paler brown, the greater coverts, the median, the lesser, the tertials, and the scapulars most conspicuously buff-edged; wing-lining and axillars dark grayish clove-brown. TAIL brownish black with very narrow buffy white tipping often extending to outer webs of distal pair. BILL "black" (*ex* label); in skin, black.

LEGS AND FEET "black" (*ex label*); in skin, black. IRIS "brown" (*ex label*); in skin, eyelids black.

Birds become an extremely faded pale wood-brown with whitish edgings before the darker gray winter plumage comes in.

First Winter or Non-nuptial Plumage

REFERENCE SPECIMENS.—B.-S., No. 522; May 19, 1913; Ancon, Peru; and other May specimens.

Acquired by a partial postjuvenal moult in March, April and May.

BACK, rump, and upper tail-coverts uniform mouse-gray, some of the feathers with partly dusky centers. HEAD similar, no hood, but the hind neck much darker, the feathers basally grayish white; dusky eye-crescent (largely a matter of how the light strikes); the eye-ring a paler gray than adjacent areas. UNDERPARTS, chin, throat and breast mouse-brown, a little dusky clouding on sides of throat and sometimes across it. WINGS, tail, and posterior body plumage retained from the juvenal stage, the wing-coverts bleached and worn. BILL AND SOFT PARTS like the juvenal.

First Nuptial Plumage

REFERENCE SPECIMENS.—B.-S., No. 1449; ♀; October 15, 1913; Corral, Chile; much worn.

Acquired by a partial prenuptial moult in September and October.

Like the first winter, but many of the new feathers of back and throat are grayer. The head is mixed partly white and partly grayish brown; in the more backward birds very little if any white. Wings and tail of juvenal plumage still retained. Bill and soft parts unchanged.

Second Winter or Non-nuptial Plumage

Figure 28.

REFERENCE SPECIMENS.—J. D., No. 52410; ♂; April 24, 1913; Ancon, Peru; outer primaries not half grown, tail new. B.-S., No. 2288; ♀; March 13, 1914; Valparaiso, Chile; outer primary not grown, tail new. A. M. N. H., No. 173140; ♀; July 18, 1922; Jambeli Island, Ecuador; much worn.

Acquired by a complete postnuptial moult in March, April and May.

MANTLE dark neutral or mouse-gray, usually browner than in the adult. HEAD with a pale mouse or wood-brown hood, paler on forehead and chin, set off from the gray back by a dusky flecked area like the first winter, eye-crescent merely a dark shading; eye-ring gray like the back. UNDERPARTS wholly gray like the back and perhaps averaging a little browner than in birds a year older, the inconspicuous hood reaching the throat and followed by a dusky spotted area, extending from the hind-neck. WINGS: dull black, without edgings, the proximal three or four primaries very faintly tipped with grayish white; the secondaries rather broadly tipped with white forming a wing-bar; greater and outer coverts mouse-gray (in the more backward birds, browner); median and lesser grayer; primary coverts and alula brownish black; axillars and wing-lining grayish clove-brown. TAIL brownish mouse-gray, all

the rectrices broadly (25–35 mm.) banded with dull black. BILL AND SOFT PARTS unchanged.

It might well be in a bird of this size that the numbers would be nearly equal of those that acquire adult tails and those that acquire tails only a step in advance of the juvenal, but the series of specimens indicates that a second postnuptial moult is usually required to give the grayer, less broadly banded tail of the adult. There is complete intergradation between the two types, and probably some if not many of this species are virtually adult in their second year. The plumage-cycle is probably a three-year one although the species is rather small and should not require so long a time.

Second Nuptial Plumage

REFERENCE SPECIMENS.—J. D., No. 52413; ♀; September 22, 1913; Corral, Chile; moult just beginning and new white feathers in the brown hood. A. M. N. H., No. 113399; ♀; February 2, 1912; Puyehue, Cautin, Chile; very worn breeding plumage.

Acquired by a complete prenuptial moult chiefly in September and October. Differs from the winter in that a complete white hood in contrast to the gray back replaces a pale brown one. The mantle and breast get fresh grayer feathers. The wings and tail of winter are retained. Bill and soft parts unchanged.

Third Winter or Non-nuptial Plumage (Adult)

Figures 27, 29, and 30

REFERENCE SPECIMENS.—J. D., No. 52411; ♀; May 8, 1913; Ancon, Peru; two old primaries remaining. A. M. N. H., No. 173139; July 18, 1922; Jambeli Island, Ecuador; new outer primary not quite grown.

Acquired by a complete postnuptial moult in March, April and May, sometimes later.

MANTLE dark neutral gray lacking brown tinge of the second winter and few or no dusky spots on neck; rump and tail-coverts same shade of gray as back. HEAD with a wood-brown hood, rather paler and more pinkish than in the second winter, inconspicuous eye-ring gray, dusky eye-crescent faint. UNDERPARTS uniformly gray like the mantle except where the brown hood descends on the upper throat which lacks the spotted area of the second winter. TAIL less banded and more clearly gray than in second winter, the outer and middle pairs of rectrices largely gray, the former often with only dusky shaft-streaks. BILL, LEGS AND FEET "black" (*ex label*). IRIS "brown" (*ex label*).

Third Nuptial Plumage (Adult)

REFERENCE SPECIMEN.—A. M. N. H., No. 113398; ♀; January 30, 1912; Cautin, Chile.

Acquired by a partial prenuptial moult in September and October. Much like the second nuptial, but the retained winter tail is characteristic, being less banded, especially on the outer and middle pair of rectrices.

SUMMARY

This South American species is characterized by medium size, rather slender black bill and feet, uniform mouse-gray color, black wings, pale brown hood in winter (white in breeding season), and a banded gray tail; the young bird browner, with conspicuous buff edgings, the tail browner and more widely banded resembling *belcheri* in the conspicuous edgings.

Larus heermanni

Heermann's Gull

Plate XIII; Figures 31 to 36

Larus heermanni CASSIN, 1852, Proc. Acad. Nat. Sci., Phila., VI, p. 187 (San Diego, California).

Larus belcheri BAIRD, 1852, in Stansbury's 'Gt. Salt Lake,' p. 335.

DISTRIBUTION

Breeding range limited to islands of the Gulf of California (Raza, Ildefonso) and of the coast of Mexico (Las Marietas) migrating northward after the breeding season to California and occurring as far north as southern British Columbia and also casual as far south as Guerrero, Mexico (Acapulco Bay).

MEASUREMENTS

	MALES (14)	FEMALES (10)
Wing	337-368 (347.3)	329-344 (337.7)
Tail	138-154 (142.3)	132-144 (138.2)
Tarsus	52- 58 (54.8)	49- 53 (51.6)
Toe without claw	41- 49 (45.2)	41- 43 (42.4)
Culmen	37- 48 (43.7)	40- 43 (41.3)
Bill at base	12- 15 (13.4)	11- 13 (12.1)
Bill at angle	12.5- 15 (14.1)	12- 14 (12.7)

MOULTS AND PLUMAGES

Natal Down

REFERENCE SPECIMEN.—J. D., No. 35830; ♀; April 14, 1909; Tres Marietas Islands, Mexico.

BACK and flanks grayish buffy white with fine mottling of clove-brown. HEAD pale creamy buff, richer on forehead and nape, with a very few fine black specklings on the crown, the neck practically unspotted. UNDERPARTS buffy white, buffier on throat, unmarked. WINGS mottled along radio-ulnar surface, rest buffy white,

deeper buff on inner margin. LEGS AND FEET, in skin, dusky brown. BILL, in skin, yellowish flesh, slightly dusky at base. IRIS "brown," (*ex label*).

The whitest, creamiest of any downy gull seen but with fine spotting, a very little on the head and more on the back. The down is remarkably short and woolly.

Juvenal Plumage

Figures 31 and 32

REFERENCE SPECIMEN.—A. M. N. H., No. 173919; ♀; August 8, 1922; Cedros Island, Lower California.

BACK AND MANTLE-AREA deep sooty clove-brown, with narrow buff edgings including the rump and tail-coverts. HEAD AND NECK slightly darker, practically without edgings; eye-ring and eye-crescent dusky but lost in the surrounding deep brown. UNDERPARTS similar, but of a solid brown color except a few buff edgings on sides, throat, flanks and tail-coverts; a trifle paler on the chin and adjacent throat where the feathers are scanty and the whitish shafts may be seen. WINGS: primaries, their coverts, secondaries and alula dull brownish black, tips of the feathers scarcely paler; tertials and coverts like the back conspicuously tipped with pale buff; lining and axillars deep clove-brown. TAIL dull black, very narrowly (2–3 mm.) tipped with pale buff, sometimes not at all. BILL (see Pl. XIII, fig. 3); "light or vinaceous buff near gape darkening through cinnamon or wood-brown to black tip, gape buff or vinaceous" (Bishop); in skin, brownish flesh merging into black about half to two-thirds of way to tip. LEGS AND FEET (see Pl. XIII, fig. 3); "black or olive-black" (B.); in skin, brownish black. IRIS (see Pl. XIII, fig. 3); "clove, auburn or dark Vandyrke brown and eyelids black" (B.); "dark coffee color" (*ex label*).

A fresh bird is uniformly deep brown with darker wings and tail, and buff edgings, but with wear the tone becomes paler the feathers greatly abraded and much paler, and the edgings are lost. Much darker than *modestus*, similar to *fuliginosus*, but unlike any other species.

First Winter or Non-nuptial Plumage

REFERENCE SPECIMENS.—J. D., No. 40107; ♀; February 6, 1914; Pacific Grove, California; worn, and the newer winter feathers of head, throat, breast and back also worn but much fresher and grayer than the juvenal.

Acquired by a partial postjuvenal moult in July, August, and September, or later.

BACK, HEAD, AND UNDERPARTS deep hair or fuscous brown grayer than juvenal and without distinct edgings; eye-ring dark gray except dusky eye-crescent anteriorly. WINGS AND TAIL of juvenal plumage retained. BILL AND SOFT PARTS much like the juvenal.

First Nuptial Plumage

REFERENCE SPECIMEN.—J. D., No. 9359; ♂; June 8, 1903; Monterey, California; badly worn.

Acquired by a partial prenuptial moult, probably in January, February, and March. Wings and tail of juvenal plumage retained, much worn and paler.

Specimens examined taken in June are too worn to determine the exact plumage, but a partly white hood and a gray breast are acquired; the backward birds browner, much like the first winter and with little white on the head. Bill and soft parts much like the juvenal, the bill sometimes with a yellowish or reddish tinge basally and the black diminished.

Second Winter or Non-nuptial Plumage

Figures 33 and 34

REFERENCE SPECIMEN.—J. D., No. 24396; ♂; June 10, 1876; Santa Cruz, California; four old primaries left, tail old except mid-pair.

Acquired by a complete postnuptial moult in July or later; those moulting earlier are probably backward birds.

BACK AND MANTLE-AREA deep mouse-gray, grayer than in first winter, though browner than in adult plumage; rump gray. HEAD with dusky, streaked hood to below eyes, partly dingy white, obscured by slaty streakings and spottings, nape paler with a few blurred dusky spots (backward birds have sooty brown heads like the first winter). UNDERPARTS much grayer than in first-winter, browner than adults. WINGS: primaries black usually without white apical spots, or the proximal quills with slightly paler tips or poorly developed spots; primary coverts and alula similar to the juvenal and without edgings. TAIL black, with a very narrow white terminal band. BILL (see Pl. XIII, fig. 4) "orange-rufous or grenadine-red, terminal third black" (Bishop); in skin, basal two-thirds yellowish-brown reddish-tinged, terminal third dull black, a speck of dull yellow at extreme tip. LEGS AND FEET (see Pl. XIII, fig. 4) "yellowish olive-buff" (B.); in skin, brownish black. IRIS (see Pl. XIII, fig. 4) "Brussels brown or raw umber" (B.).

Several backward birds are moulting early in June. The backward birds, in this as in all the species, appear to moult earlier than the normal or adult individuals.

Second Nuptial Plumage

REFERENCE SPECIMEN.—J. D., No. 23988; ♂; May 13, 1909; Tres Marietas Islands, Mexico.

Acquired by a partial prenuptial moult probably in January and February. Much like the second winter except for new white head; grayer in tone. Wings and tail of winter retained. Bill and soft parts brighter than in winter.

Third Winter or Non-nuptial Plumage (Adult)

Figures 35 and 36

REFERENCE SPECIMENS.—J. D., No. 22174; ♀; July 25, 1908; Mendocino County, California; three old primaries and three old secondaries left. J. D., No. 15297; ♀; November 30, 1905; Pacific Beach, California. J. D., No. 40857; ♂; October 21, 1913, Victoria, British Columbia.

Acquired by a complete postnuptial moult in July and August.

MANTLE deep mouse-gray. HEAD with dusky hood, indistinctly streaked with brown and white, paler on forehead and lores; partial eye-ring white posteriorly. UNDERPARTS gray, chin and upper throat white, the latter with dusky flecks on sides, sometimes obscurely across it. WINGS: primaries black, usually with narrow apical spots on three or four inner quills; apparently never on the three outer. TAIL black, with a broader white tip than in the second winter. BILL (see Pl. XIII, fig. 5); "orange-vermilion, poppy-red or scarlet, banded at tip with black, extreme tip pale yellow or white, gape orange to scarlet" (Bishop); in skin, yellowish red with black tip variable in extent, extreme tip whitish. LEGS AND FEET (see Pl. XIII, fig. 5); "deep brown to olive or slate-black" (B.); in skin, black. IRIS (see Pl. XIII, fig. 5); "tawny olive to yellowish brown or cream; eyelids orange-scarlet or carmine" (B.).

The species evidently has a three-year plumage-cycle, fully adult plumage and colors of the soft parts not being acquired until the second postnuptial moult.

Third Nuptial Plumage (Adult)

REFERENCE SPECIMENS.—J. D., No. 24395; ♀; January 23, 1896; San Diego, California. J. D., No. 23938; ♂; April 13, 1909; Tres Marietas Islands, Mexico.

Acquired by a partial prenuptial moult, early in the winter (January and February). Like the winter, except for a creamy white hood, set off sharply on the nape, but blending into gray of the breast. Wings and tail of winter retained. Bill and eyelids become bright carmine or vermilion, the bill usually with (sometimes without) a slight black tip, the extremity yellowish. Other soft parts much like the winter (see Pl. XIII, fig. 6).

SUMMARY

Larus heermanni is a Mexican and West Coast species. The characters are medium size, larine, red bill, usually with a dusky tip, black feet, gray plumage, black wings, a dusky hood in winter replaced by white in the breeding season and a black tail, white-tipped; the young bird resembles *fuliginosus*.

It appears to be a link connecting *fuliginosus* and *modestus* with the others of the subgenus *Adelarus*, and has no very distinctive characters to separate it from the rest of the large gulls. It is the only gul

with a black tail when adult, and it has a white head (it is a white hood in contrast to the gray adjacent) like *modestus* when in breeding plumage. It is the only North American gull that migrates northward after the very early breeding season, a peculiarity which, taken in connection with the plumage similarities, points to relationship with the equatorial or southern ranging group of gulls included in *Adelarus*.

Larus leucophthalmus

White-browed Gull

Figures 37 to 42

Larus leucophthalmus TEMMINCK, 1825, 'Pl. Col.,' part 62, Pl. CCCLXVI (Red Sea).

Larus massauanus HEUGLIN, 1861, 'Peterm. Mitth.,' p. 31.

DISTRIBUTION

More or less resident on islands and shores of the Gulf of Aden and the southern half of the Red Sea, wandering after the breeding season sometimes to Suez and to the Arabian and Somali coasts.

MEASUREMENTS

	MALES (5)	FEMALES (6)
Wing	318-332 (325.2)	305-312 (308.7)
Tail	115-125 (120.0)	107-115 (111.2)
Tarsus	45- 50 (47.8)	44- 47 (45.2)
Toe without claw	34- 40 (38.0)	34- 38 (35.7)
Culmen	44- 52 (48.8)	43- 46 (44.5)
Bill at base	10- 12 (11.3)	10- 11 (10.4)
Bill at angle	10- 12 (11.0)	10- 10 (10.0)

MOULTS AND PLUMAGES

Natal Down

No specimens examined.

Juvenal Plumage

Figures 37 to 39

REFERENCE SPECIMENS.—Brit. M. (Saunders, No. 1788); ♀; June 8, 1868; Zoulla, Eritrea; largely in first winter plumage and much worn.

BACK AND MANTLE-AREA mouse-brown, deeper than in *hemprichi*; rump grayish white. HEAD deep mouse-brown with slightly paler edgings, cervical region rather narrowly streaked with black (instead of being plain brown as in *hemprichi*), this streaking or spotting with white edgings extending down to and across the throat; eye-crescent dusky, a black line through eye; eye-ring broadly dull white. UNDER-PARTS largely brown, chin, part of throat and posterior parts dull white. WINGS: primaries dull brownish black, secondaries with narrow white edgings forming a wing-bar; coverts paler brown than the secondaries; wing-lining mouse-brown. TAIL dull brownish black (without white tipping) with some basal white and a white

ragged area on the outer rectrix with white on the inner web, oblique, (not as square as in *hemprichi*), the black extending down beside the shaft, second pair similar, others with very little, if any, basal white. BILL black; in skin, dull black, base of under mandible pale brown (Reichenow). LEGS AND FEET greenish lead-color; in skin, yellowish brown (R.). IRIS probably brown.

Juvenal birds resemble *hemprichi* but differ from it in size, in the longer, slenderer, darker bill and longer, slenderer tarsus, in less white tipping and oblique basal white of the tail, in the streaking and spotting on the neck and throat, and in having the secondaries with narrower white edgings.

First Winter or Non-nuptial Plumage

REFERENCE SPECIMEN.—Brit. M. (Saunders, No. 1789); ♀; June 8, 1868; Zoulla, Eritrea; plumages mixed.

Acquired by a partial postjuvenal moult chiefly in late fall and early winter.

BACK slightly grayer than the juvenal. HEAD grayer than the juvenal or than *hemprichi*, somewhat mixed gray and dusky; eye-ring whiter. UNDERPARTS grayer than the juvenal, dusky streaking and spotting outlining a sort of "apron" on throat, a gray band next to this and on sides of the neck which blends into white posteriorly. WINGS AND TAIL of juvenal plumage retained much faded and worn. BILL AND SOFT PARTS like the juvenal.

First Nuptial Plumage

REFERENCE SPECIMEN.—Brit. M. (Saunders, No. 1789); ♀; June 8, 1868; Zoulla, Eritrea.

Acquired by a partial prenuptial moult chiefly in the spring. Differs from the first winter in acquiring an imperfect black hood and "apron." Wings and tail of juvenal plumage retained, much worn. Bill and soft parts little changed from winter.

Second Winter or Non-nuptial Plumage

Figure 40

REFERENCE SPECIMEN.—Brit. M., 91.5.21.21; ♀; June 8, 1868; Zoulla, Eritrea.

Acquired by a complete postnuptial moult, in fall and winter.

MANTLE deep mouse-gray, rump pale gray, sometimes nearly white. HEAD with a brownish black grizzled hood, nape paler gray, and an imperfect narrow white cervical collar; eyelid white interrupted by black line through eye. UNDERPARTS and upper breast with a grizzled black "apron" set off from the light mouse-gray of the breast and sides which blends into the white of rest of the lower parts. WINGS: primaries black, with no white tips like *hemprichi*, until the fourth to first which are faintly whitish; secondaries black basally, broadly white-tipped with a gray area forming a conspicuous band on the wing; the coverts and tertials are grayer (although often brown-tinged) than in the first winter; wing-lining gray. TAIL

largely white, with a blotchy subterminal band or series of spots or dusky shaft streaks, the outer and the mid-pairs white, the others with more or less smudging. BILL, in skin, black at tip, pale brown basally. LEGS AND FEET, in skin, pale yellowish brown. IRIS probably brown.

The series examined, containing many moulting specimens of June 8, has not been very satisfactory and it has been necessary to piece together the plumages here described.

Second Nuptial Plumage

No specimen examined.

Acquired by a partial prenuptial moult plus wear. Probably differs little from the second winter, except the hood a clear black.

Third Winter or Non-nuptial Plumage (Adult)

Figures 41 and 42

REFERENCE SPECIMEN.—M. C. Z., No. 75607 (no data); near end of postnuptial moult, the two outer primaries half-grown.

Acquired by a complete postnuptial moult in August and September or often much later.

MANTLE clear rather deep mouse-gray, rump paler, upper tail-coverts white or gray, this color usually extending into the central rectrices. HEAD, a grizzled black hood, nape pale gray like the mantle, a narrow white cervical collar, eye-crescent and line through eye dusky, partial eye-ring white. UNDERPARTS with a somewhat grizzled black "apron" (an extension of the hood), the gray breast and sides paling into the white of the abdomen. WINGS: primaries black, no white apical spots till the seventh or sixth, then increasing in size inwards, rest of wing mouse-gray, except white bar at ends of secondaries which are black on outer webs of the proximal quills; tertials whitish at tips; edge of wing white, lining gray. TAIL white, grayish at base of central pairs, often with narrow dusky subterminal shaft-streaks. BILL, in skin, flesh-brown, a dusky banded tip beyond the nostrils. LEGS AND FEET, in skin, yellowish flesh-brown.

This species appears to have a three-year plumage-cycle, although I am inclined to believe the variation may be only that arising from the different breeding dates of colonies and that a two-year cycle prevails. There seems to be a considerable number of backward birds that further confuse the facts.

Third Nuptial Plumage (Adult)

REFERENCE SPECIMEN.—Brit. M., 1915. 12.24.74; ♂; May 22, 1908; Suakin, Nubia.

Acquired by a partial prenuptial moult in the spring; wings and tail of winter retained. Differs little from winter except that the hood and "apron" are black instead of grizzled and there is a whiter collar on nape.

BILL "dark carmine red" (*ex label*) yellow-red to coral-red, tip black (Reichenow, 1894) in skin, yellowish brown with black tip. FEET "lemon yellow" (*ex label*). IRIS umber-brown (Heuglin) (not white as generally described); eyelids red (Hartert), in skin, black.

SUMMARY

This Red Sea species is characterized by a long and rather slender bill equalling tarsus, medium size, black wings, a black hood and "apron" (grizzled in winter plumage), a narrow white collar, a brownish gray mantle, light underparts, and a white tail; the young bird is mostly brown, the tail practically without white except an oblique area on the outer pair of feathers.

The species is a connecting link between the *Adelarus* group and the hooded gulls (*Hydrocolæus*). It is the only species with an "apron," and its affinity with *hemprichi* is evinced by the brown tone, the black primaries, and the similar pattern of the tail in the first year. It differs from *hemprichi* in body plumage when adult, and in the spotting on the throat and the oblique white area on the tail when young. In the colored bill with a band at the tip it resembles *heermanni*. The black hood indicates relationship with the hooded gulls, where possibly it should be placed, but its other characters seem to outweigh this one. This species seems to mark the place where the hooded gulls diverge from the others.

Larus hemprichi

Hemprich's Gull

Figures 43 to 48

Larus crassirostris BOIE, 1844, Isis, p. 192.

Adelarus hemprichii BRUCH, 1853, Journ. für Orn., p. 106 (Red Sea).

DISTRIBUTION

A marine species breeding on islands near the southern end of the Red Sea and along both shores of the Gulf of Aden, wandering after the breeding season north in the Red Sea, along the coasts of Arabia to the Makran Coast, probably the Persian Gulf, and also occasionally as far as Bombay, India, and Zanzibar, East Africa.

MEASUREMENTS

	MALES (10)	FEMALES (14)
Wing	330-352 (342.5)	318-340 (330.1)
Tail	120-132 (127.2)	114-126 (119.7)
Tarsus	53- 59 (55.0)	48- 56 (52.1)
Toe without claw	39- 43 (40.5)	34- 43 (38.5)
Culmen	47- 52 (50.1)	44- 52 (46.9)
Bill at base	13- 15 (14.3)	12-14.5 (13.1)
Bill at angle	13- 14 (13.4)	11- 14 (12.6)

MOULTS AND PLUMAGES

Natal Down

No specimen examined. Plain buffy white unspotted (Bull. Brit. Orn. Club, XXXI, No. 183, December 1, 1912, p. 23).

Juvenal Plumage

Figures 43 to 45

REFERENCE SPECIMENS.—U. S. N. M., No. 103417; ♂; October 16, 1873; Aden, Arabia. Brit. M., 88.2.1.21; ♂; November 15, 1885; Manda Island, Red Sea.

BACK AND MANTLE-AREA warm sepia-brown with broad slightly paler buffy edgings; rump ashy, gray upper tail-coverts paler. HEAD paler than the back with narrower edgings; sides of neck a still paler brown; forehead dull gray faintly flecked; eye-ring deep gray, a whitish spot on upper lid, narrow eye-crescent black. UNDERPARTS grayish white, upper breast and sides brown like the back merging into grayish posteriorly; the chin, throat, and under tail-coverts dull grayish white with faint dusky fleckings. WINGS dull black, the inner three or four primaries very slightly tipped with dull grayish white, the secondaries browner, scarcely tipped, the greater coverts still paler and faintly tipped with buff; the lesser and median coverts brown and edged like the adjacent back; tertials broadly tipped and more buffy. TAIL white basally, chiefly on inner webs, with a broad (20–35 mm.) dull black, ill-defined subterminal band chiefly on outer two pairs of rectrices, and narrow (about 2 mm.) whitish tipping; the black extends on the outer webs of the outer two pairs nearly to base and the other rectrices are often nearly all black; the outer pair sometimes gray with dusky shaft streaks. Tail sometimes wholly black. BILL lead-gray with a blackish band before the yellowish tip (Reichenow); "slaty olive, tip black" (*ex* label); in skin, dull black beyond the nostrils, basal two-thirds olive-gray fading to yellowish flesh. LEGS AND FEET greenish flesh-color (R.); in skin, dusky greenish brown. IRIS "brown," "hazel" (*ex* labels); in skin, eyelids black, in life, blackish flesh (Heuglin).

Birds are uniformly brown except dull white posteriorly on the underparts, the edgings conspicuous, the head paler.

First Winter or Non-nuptial Plumage

REFERENCE SPECIMENS.—Brit. M., 91.5.20.200; February 21, 1872; Muscat, Arabia; others in March.

Acquired by a partial postjuvenal moult varying from October to December in Red Sea specimens, and apparently later from January to March in those from the Persian and adjacent coast of Baluchistan.

BACK a grayer olive-brown than the juvenal and without edgings. HEAD paler than back, faint grayish edgings, nape darker like the back; eye-ring deep gray with white spot on upper lid; dusky at both corners of the eye. UNDERPARTS dull white with broad brownish band descending from sides of the neck across lower throat, the upper throat and chin whiter lightly flecked or spotted; sides and flanks grayish brown. WINGS AND TAIL of juvenal stage retained becoming much worn. BILL AND OTHER SOFT PARTS much like the juvenal.

The evidently long and irregular breeding season of this species, although the peak seems to be in June and July in the Red Sea, results in the postjuvenal moult and the acquisition of the first winter plumage taking place at almost any time from September to March. There also seems to be an overlapping of the prenuptial moult which takes place chiefly in the spring, so that there is much mixing of several plumages. It is probable that the peak of the moult is different in different localities, perhaps in different colonies.

First Nuptial Plumage

REFERENCE SPECIMENS.—M. C. Z., No. 56409; ♀; June 17, 1909; Aden, Arabia; very worn. J. D., No. 56704; ♀; July 15, 1922; Aden, Arabia; much worn and beginning the postnuptial moult.

Acquired by a partial prenuptial moult usually at its peak in Red Sea specimens in April or May. Apparently differs very little from the first winter. The wings and tail retained. Bill and other soft parts much like the winter.

Second Winter or Non-nuptial Plumage

Figure 46

REFERENCE SPECIMENS.—J. D., No. 56705; ♂; January 25, 1923; Karachi, India; worn, but new tail and part of body indicates prenuptial moult. Brit. M., 91.5.20.194; February 22, 1872; Muscat, Arabia; and Brit. M., 69.10.17.447; ♀; July 26, 1868; Massaua, Eritrea; perhaps a backward bird, completing postnuptial moult, therefore moulting early.

Acquired by a complete postnuptial moult that takes place from August to December in Red Sea birds and from January to May in Makran coast specimens, but apparently with great irregularity, as the primaries are found moulting practically every month of the year.

MANTLE deep olive or blackish brown, darker than juvenal. HEAD paler than mantle, somewhat mixed with gray and indistinctly set off from the gray nape by a browner margin; eye-ring white interrupted at corners by dusky eye-crescent. UNDERPARTS white merging into grayer throat, breast and sides; chin and throat white-flecked, spotted on upper throat. WINGS: primaries black with apical grayish white from about the sixth or fifth increasing inwards; others like back, no edgings; secondaries black, narrowly white-tipped; coverts brown. TAIL largely white with an ill-defined subterminal band consisting of dull black smudges on both webs of four (sometimes five) central pairs of rectrices and shaft lines only, or occasionally a smudge on outer two pairs which rarely are entirely white; backward birds assume tails hardly different from the first winter. BILL and soft parts much like the first winter in some specimens and more advanced with some of the adult colors in others. LEGS AND FEET, in skin, dark greenish gray. IRIS "dark brown" (*ex* label).

The size of the species is such that it is probable that some birds acquire adult plumage at this period, but in a large series examined it is

evident that probably another year is required in at least the majority of cases. The protracted or irregular breeding season makes it difficult to estimate the normal advance of plumage, but by April at the latest the postnuptial moult is usually well towards completion. Some birds, however, are months earlier.

Second Nuptial Plumage

REFERENCE SPECIMENS.—Brit. M., 91.5.20.21; ♀; April 2, 1877; Aden, Arabia.

Acquired by a partial prenuptial moult not including wings or tail; apparently at the peak in the spring.

HEAD, throat, breast, and back much like the winter, but head browner and a narrow white collar on neck. The old wings and tail are retained. BILL gets tinge of red at tip. LEGS AND FEET become more greenish.

Third Winter or Non-nuptial Plumage (Adult)

Figures 47 and 48

REFERENCE SPECIMENS.—Brit. M. (Saunders, No. 2972); January 9, 1875; Karachi, India; six old primaries remaining, tail partly new.

Acquired by a complete postnuptial moult extending irregularly from August to March, there being great variation in the time, probably due to the different breeding times of different colonies in different years. Red Sea birds seem to be months earlier than those of the Persian coasts. Specimens taken June 10, at Zoulla, and one February 22, at Muscat, are at identically the same stage of the moult, both with the outer primary only partly grown.

MANTLE grayish clove to dark hair-brown. HEAD with a dark brown hood, somewhat grizzled with gray darkest at the posterior margin where it is sharply contrasted with a grayer cervical collar and dark neck and back. UNDERPARTS whitish, pale brown chin, darker at edge of hood which contrasts with the grayer brown throat, breast and sides which merge gradually into white posteriorly. WINGS: primaries, the three outer wholly black, the inner black with small white apical spots increasing inwards, the sixth or fifth abruptly tipped the inner grayer and with fused tips and edges; primary coverts and alula black; secondaries deep clove-brown with broad white tips and edges; tertials, greater, median, and lesser coverts and wing-lining wholly brown. TAIL white. A few backward individuals show smudges on the tails, and apparently some of the outer white rectrices of the second year are replaced by somewhat smudged ones, as specimens in moult indicate. BILL greenish yellow with black cross-band just before the yellow red tip (Reichenow); in skins the colors persist although fading somewhat. LEGS AND FEET olive-green yellowish drab (R.); in skins, a dusky greenish gray. IRIS light brown; eyelids red (R.); in skins, black.

The species seems to have a three-year plumage-cycle but, on account of the long and irregular breeding season, it is not possible to be sure of this, judging only by the specimens examined.

Third Nuptial Plumage (Adult)

REFERENCE SPECIMENS.—U. S. N. M., No. 213352; ♀; April 15, 1909; Aden, Arabia.

Acquired by a partial prenuptial moult, not including wings or tail, in the spring. Like the winter except the hood is a clear blackish brown with a narrow white collar instead of gray next to the hood. Bill and other soft parts somewhat brighter colored.

Hood and mantle are much alike in both summer and winter plumage, the hood being mixed black and gray in winter.

SUMMARY

A common species on the coasts and islands of the Red Sea. Adults are the brownest in tone of any gull. Winter and summer they have brown hoods that are a little darker than the back, separated from it by a white collar in nuptial, and a gray one in winter plumage. The hood grows gradually darker until it is almost black at its posterior edge. The black primaries, grayish brown mantle, banded bill, and lower parts brown anteriorly show a close affinity to *leucophthalmus*, differing in browner tone and in pattern of the body plumage. The stouter bill is, however, a more prominent difference.

Since this portion of my paper was put in type, an account of the moults and plumages of the species has appeared (Meinertzhagen, 1924). It may seem rather difficult to reconcile some of our independent conclusions, but I cannot help supposing that the writer did not allow for the considerable variation always found in immature birds and, like others, has been led possibly into confusing first and second-year birds or those of different colonies. But the discrepancies are not, after all, as great as they may seem to the casual reader.

Larus belcheri

Belcher's Gull

Figures 49 to 54

Larus belcheri VIGORS, 1829, Zool. Journ., IV, p. 358 (Chile and Peru).

Larus melanurus LICHTENSTEIN, 1854, 'Nom. Av.,' p. 99.

Larus fuliginosus CASSIN, 1858, 'Orn. U. S. Expl. Exped. (Wilkes),' p. 378.

Larus frobeeni PHILIPPI AND LANDBECK, 1861, Wiegman, Arch. für Naturg., I, p. 292.

DISTRIBUTION

Largely resident on the Falkland Islands and various coastal islands of Chile and Peru from Cape Horn to San Gallen Island and the North Chincha Islands, wandering chiefly northward after the breeding season.

MEASUREMENTS

	MALES (6)	FEMALES (8)
Wing	348-372 (361.0)	330-352 (340.6)
Tail	128-143 (135.0)	124-143 (135.7)
Tarsus	63- 66 (64.1)	55- 60 (58.1)
Toe without claw	47- 52 (49.3)	43- 47 (45.0)
Culmen	50- 52 (51.3)	46- 51 (47.8)
Bill at base	14- 16 (15.2)	14- 15 (14.2)
Bill at angle	15- 17 (16)	15- 16 (15.2)

MOULTS AND PLUMAGES

Natal Down

REFERENCE SPECIMENS.—Brit. M., 13.11.10.41; December 19, 1912; North Chincha Island, Peru. Brit. M., 13.11.10.40; December 13, 1912; Independencia Bay, Peru; similar but double the size and more advanced, as the juvenal feathers are showing almost everywhere.

BACK grayish white, sparsely lined or mottled with pale clove-brown. HEAD whiter with darker bolder spots, rather few and in irregular lines. UNDERPARTS grayish white, faintly buff and practically unmarked save small black spots on the side of the chin and a very obscure dusky speckling posteriorly. BILL, in skin, brownish flesh. LEGS AND FEET, in skin, dusky or greenish brown. IRIS probably brown.

The downy young is very pale as compared with other gulls. This is unexpected in a species that is so dark when adult.

Juvenal Plumage

Figures 49 and 50

REFERENCE SPECIMENS.—J. D., No. 52416; ♂; May 19, 1913; Ancon, Peru. B.-S., No. 543; ♂; April 28, 1913; and B.-S., No. 549; ♀; May 12, 1913; Ancon Peru.

BACK AND MANTLE-AREA very pale clove-brown, the feathers subterminally darker and very broadly edged with pale buff soon fading to white, more or less "watered," the broad edgings producing a very white, mottled appearance. HEAD deep blackish clove-brown faintly edged with buff, the hind neck richer sepia in contrast to the much paler adjacent back; forehead paler because of wider, paler edgings; no obvious hood, the occiput fusing into the brown nape and this in turn into the whitish back; eye-ring whitish with dusky speckling; eye-crescent dusky. UNDERPARTS, throat, breast and sides of neck brown like the neck, the feathers of the breast and sides whitish basally with deep brown subterminal bands and buffy white edgings; chin dull white, obscurely streaked and spotted; abdomen, flanks and crissum dull white, the change from the dark breast gradual; under tail-coverts subterminally with sparse dusky barring or spotting. WINGS: primaries dull black with narrow white or buffy edgings on four or five proximal quills; secondaries narrowly tipped and edged with white; tertials and greater coverts similarly tipped but browner and "watered" like the back; median and lesser coverts and edge of wing much like back; wing-lining pale clove-brown, buff-edged, the reversed coverts dull drab, un-

marked; alula and primary coverts dull black, narrowly white-tipped. TAIL dull black with inconspicuous white or "fogged" area basally, increasing outwards and most marked on the distal pair of rectrices, where the outer webs and three-quarters of the inner are mostly white, all quills with rather narrow (4-6 mm.) whitish tips; central pair dusky to base. BILL "flesh, tip black" or "whitish, tip blackish" or "yellowish, tip black" (*ex labels*); in skin, ochre-yellow basally and the extreme tip with a black, sharply defined band beyond the nostril on the upper mandible and slanting on the lower mandible to the middle of the nostril. LEGS AND FEET "grayish," "yellowish grayish," or "light grayish" (*ex labels*); in skin, dusky brown. IRIS "brown" (*ex label*).

The pale, "watered" back and the neck gradually fuse into the darker head and throat, which becomes somewhat grizzled with the fading and loss by abrasion of the buff edgings. The combination of black wings and tail-pattern is unlike any other gull; the tone is much paler than *crassirostris*.

First Winter or Non-nuptial Plumage

REFERENCE SPECIMEN.—B.-S., No. 549; ♀; May 12, 1913; Ancon, Peru.

Acquired by a partial postjuvenal moult in April and May.

BACK similar to the juvenal, but a paler more "watered" brown. HEAD blackish brown with faint buffy edgings, darker and grayer than the juvenal; neck a richer brown, merging into gray posteriorly. UNDERPARTS grayer than the juvenal; the chin white. WINGS AND TAIL of juvenal plumage retained. BILL AND SOFT PARTS like the juvenal.

First Nuptial Plumage

No specimen examined.

Acquired, no doubt, by a partial prenuptial moult, probably in July, August and September. Probably differs little from the first winter plumage, except whiter neck and perhaps a largely white head.

Second Winter or Non-nuptial Plumage

Figures 51 and 52

REFERENCE SPECIMENS.—J. D., No. 52414; ♀; May 12, 1913; Ancon, Peru. B.-S., No. 545; May 12, 1913; Ancon, Peru.

Acquired by a complete postnuptial moult in March, April, and May.

BACK AND MANTLE-AREA brownish slate; rump pale gray becoming white on upper tail coverts. HEAD with a slaty brown hood, forehead and sides of head with faint whitish edgings; eye-ring grayish white sometimes with a few dusky feathers. black at corners of eye. UNDERPARTS chin and throat white duskily flecked and almost solidly dusky on jugulum; breast a pale gray, merging into the whiter abdomen and crissum. WINGS lack the edgings of the first year; tone browner than in the adult; brownish white tipping on the inner three or four primaries, the second-

aries, tertials and coverts are brownish slaty gray, not so clearly gray as in adult, the secondaries white-edged and tipped. TAIL much like the juvenal, but white areas larger and often "fogged"; not clear white like adult; middle pair dusky to base. BILL "yellow, black ring, tip red" (*ex label*); in skin, duller, but resembling the adult. LEGS AND FEET "yellow" (*ex label*); in skin, dusky fleshy brown. IRIS "brown" (*ex label*).

On account of size it is possible that a number of specimens acquire adult characters at the first postnuptial moult but there seems to be also a number that reassume first-year tails or ones very like them.

Second Nuptial Plumage

REFERENCE SPECIMENS.—J. D., No. 52417; ♀; July 3, 1913; San Gallen Island, Peru; new feathers growing and only flecks of worn, brown feathers of the hood remaining on head and throat.

Acquired by a partial prenuptial moult in July, August, and September. Differs from the winter plumage chiefly in replacement of the dark hood by a pure white head and in losing the brown flecking of the throat. Wings and tail of winter are retained. Bill and soft parts brighter than in winter.

Third Winter or Non-nuptial Plumage (Adult)

Figures 53 and 54

REFERENCE SPECIMENS.—J. D., No. 52415; ♀; May 12, 1913; Ancon, Peru. B.-S., No. 537; ♂; April 28, 1913; same data; one old primary remaining, the tail new, the middle pair of rectrices almost grown, next to the outer least, and the outer more advanced than the fifth pair; the body mostly new. B.-S., No. 536; ♂; same data; has three old primaries and two old primary coverts, the fifth and sixth pairs of rectrices and secondaries old, tertials and coverts partly new.

Acquired by a complete postnuptial moult in March, April and May.

MANTLE slaty black. HEAD with a dull brownish black hood to well below the eye, whiter forehead and lores; eye-ring white, dusky at corners of eye; neck pale gray. UNDERPARTS white, a pale gray wash on the breast, dusky spotting and slight, streaked collar across upper throat, descending from the hood. WINGS: primaries black, the inner three or four grayer and with narrow white tips; secondaries and tertials slatier with broad (15–20 mm.) white tips; coverts like mantle. TAIL white with a broad black band, occupying one-half of the tail, and with rather broad (6–10 mm.) white tipping. BILL "red at tip, black band, basally yellow" (*ex label*); in skins, yellowish base, black band and pale red tip. LEGS AND FEET "yellowish" "yellow" (*ex labels*); in skins, ochre-brown. IRIS "brown" (*ex label*).

The species evidently has a three-year plumage-cycle.

Third Nuptial Plumage (Adult)

No specimen examined.

Acquired doubtless by a partial prenuptial moult in July, August, and September. Differs from third winter probably only in assuming a

wholly white head instead of the dark hood. Wings and tail of winter retained. Bill and soft parts brighter than in winter.

SUMMARY

This South American gull, easily recognized by its banded heavy bill and banded tail, black primaries, nearly black mantle, and white head, seems rather closely related to *Larus crassirostris* but lacks the grayer wing-pattern. It has rougher tarsi and feet, and the webs of the feet are more deeply incised. The juvenal plumage is paler than that of any of the *Adelarus* group because of the very broad fused edgings, but resembles that of *modestus*.

Larus crassirostris

Temminck's Gull

Figures 55 to 60

Larus crassirostris VIEILLOT, 1818, 'Nouv. Dict. d'Hist. Nat.,' XXI, p. 508 (Nagasaki, Japan).

Larus melanurus TEMMINCK, 1828, 'Pl. Col.,' part, p. 77, Pl. CCCCLIX.

Larus belcheri PELZELN, 1873, Verh. z.-b. Gesch., Wien, p. 160.

DISTRIBUTION

The breeding range includes some of the islands and shores of the northern part of the Japan Sea, bordering eastern Siberia, China, and Japan; in winter extending south on the coast of China to Hongkong.

MEASUREMENTS

	MALES (8)	FEMALES (5)
Wing	340-380 (363.5)	341-361 (348.0)
Tail	130-149 (140.9)	128-141 (134.2)
Tarsus	47- 57 (54.9)	49- 53 (50.4)
Toe without claw	37- 42 (40.8)	37- 41 (38.8)
Culmen	43- 54 (48.2)	43- 45 (43.8)
Bill at base	12- 15 (14.2)	12-13.5 (12.9)
Bill at angle	13-16.5 (15.0)	13- 14 (13.9)

MOULTS AND PLUMAGES

Natal Down

No specimen examined.

Juvenal Plumage

Figures 55 and 56

REFERENCE SPECIMENS.—M. C. Z., No. 82569; ♂; October 26, 1913; Tsurumi, Musachi, Japan; partly in first winter plumage. J. D., (unnumbered); ♂; September 1898; Chefu, China.

BACK AND MANTLE-AREA clove-brown with grayish buff edgings; rump paler and tail coverts dull grayish white, brown-spotted or streaked. HEAD paler, the neck and sides of the throat a reddish or chocolate-brown with paler edgings; forehead a little whitish. UNDERPARTS dull white, mouse-gray or brown on throat and sides, chin paler, the feathers basally white with faintly buff edgings producing with wear an obscurely mottled effect. WINGS: primaries and secondaries, brownish black, tertials and greater coverts pale grayish clove-brown with faint buffy white edgings increasing in amount on the inner; lesser and median coverts similar and narrowly edged; wing-lining and edge of wing clove-brown narrowly edged or scalloped, the axillars grayer with whitish shafts. TAIL deep clove-brown or brownish black faintly edged terminally with buffy white; under coverts brown-streaked. BILL flesh-colored with black tip (Hartert); in skin, basal two-thirds pale yellowish flesh, sharply defined from black beyond the nostrils, to and including the extreme tip. LEGS AND FEET flesh-colored (H.); in skin, brownish flesh.

A rich brown bird at this stage, showing considerable variation in tone, the edgings not very conspicuous. Unlike *fuliginosus*, *heermanni*, or *modestus* in having the underparts largely grayish white, whereas these three are of the same brown color everywhere. Resembles *hemprichi* or *leucophthalmus* but differs in having the tail wholly dark brown. The four gulls which have wholly dark tails in juvenal plumage are *fuliginosus*, *heermanni*, *modestus*, and *crassirostris*.

First Winter or Non-nuptial Plumage

REFERENCE SPECIMEN.—M. C. Z., No. 82569 (cited above).

Acquired by a partial postjuvenal moult plus wear in August and September; well advanced in the above specimen.

BACK grayer than the juvenal and with broad buffy gray edgings fusing with the central brown; tail-coverts much grayer. HEAD white streaked with ashy gray, palest on the forehead, becoming slaty streaked on occiput forming a partial cross-band, the hind neck again paler; eye-ring white; eye-crescent and adjacent area partly dusky. UNDERPARTS usually pure white duskily streaked on throat; under tail-coverts grayer or white and less barred than juvenal. WINGS AND TAIL of the juvenal plumage retained. BILL AND SOFT PARTS like the juvenal.

Resembles in plumage the second-winter plumage of *Gabianus pacificus* but the latter has a darker back, a streaked or spotted upper throat and chin, is much larger and has a peculiar bill and nostril.

First Nuptial Plumage

No specimen examined.

Acquired by a partial prenuptial moult in the spring.

Probably much like the first winter, but head and throat paler, the dark juvenal wings and tail retained.

Second Winter or Non-nuptial Plumage

Figure 58

REFERENCE SPECIMEN.—J. D., No. 35823; ♂; March 1912; Tokyo Bay, Japan; much worn and moulting into nuptial plumage.

Acquired by a complete postnuptial moult, probably in August and September.

MANTLE largely gray like adult, but usually with some brown. HEAD white with dusky streaking chiefly on occiput. UNDERPARTS white. WINGS: primaries, brownish black, from the sixth inward with slight apical spots, the fourth or third to first much grayer with white tips; secondaries broadly white-tipped and white on inner webs, grayer on outer with dusky areas on inner; coverts like mantle or browner. TAIL broadly (40–50 mm.) black-banded, the black extending to outer pair of rectrices and along the outer webs of several pairs.

Second Nuptial Plumage

REFERENCE SPECIMEN.—J. D., No. 14592; ♀; April 16, 1899; Yesso, Japan.

Acquired by a partial prenuptial moult in the spring. Much like the second winter but with a white head and little or no brown on the back; the old winter primaries and tail retained.

Third Winter or Non-nuptial Plumage (Adult)

Figures 57, 59 and 60

REFERENCE SPECIMENS.—J. D., No. 35824; ♀; October 10, 1913; Tokyo, Japan; first primary not three-fourths grown. A. M. N. H., No. 61523; August 17; Montague Island, China; five old primaries remaining.

Acquired by a complete postnuptial moult in August and September.

MANTLE deep neutral gray or darker and slaty. HEAD white, with grayish mottling or streaking on occiput, white hind neck. UNDERPARTS pure white. WINGS: primaries black all except two or three outer with small white apical spots increasing in size inwards; the fifth and fourth (and usually the sixth) having gray tongues also that reduce the black to subterminal bands; the second and first, wholly gray with broad white tips; occasionally a very small white spot is found on the edge of the inner web of the outer primary; secondaries like mantle and broadly (15–20 mm.) white-tipped forming a wing-bar; other coverts like mantle; lining, axillars and edge of wing, white. TAIL white about one-third of it with a broad black subterminal band, about 45 mm. on the three middle pairs of rectrices about 30 mm. on the next two pairs the outer with a half band or only a smudge on the inner web, sometimes both webs white, with only a black line on the shaft indicating persistence of the band; the tip broadly white (about 15–20 mm.). BILL yellow or greenish yellow, tip and a spot at corner of the under mandible red, a black cross-band next the red tip (Hartert); in skin, yellowish glaucous green, a black band beyond nostrils, the tip bright orange-red. LEGS AND FEET yellow or greenish yellow (H.); in skin, pale yellowish, greenish brown. IRIS pale straw-yellow or yellowish silver; eyelids vermilion-red (H.).

This is a medium-sized species and therefore it becomes virtually adult at the second postnuptial moult, having a three-year plumage-cycle.

Third Nuptial Plumage (Adult)

REFERENCE SPECIMENS.—J. D., No. 35823; March, 1912; Tokyo, Japan. U. S. N. M., No. 91616; ♀; March 29, 1883; Yokohama.

Acquired by a partial prenuptial moult in the early spring. Differs little from the third winter except that a white unstreaked head is acquired; wings and tail of juvenal plumage retained; bill and soft parts with more color, the bill crimson-tipped.

SUMMARY

A gull of the Chinese and Japanese coasts. It is one of the four species of gulls which have black-banded tails when adult, and it also has a banded and brightly colored bill and primaries that are practically black. A very small spot or mirror occurs occasionally in some specimens similar to the one found in *audouini* and suggesting relationship to this species which is also shown in the banded bill. Juvenal birds throughout the first year are a rather dark, rich brown with black wings and tails. Adults have black primaries, a dark gray mantle, and white heads in breeding dress, the head becoming duskily streaked on the occiput in winter, the species resembling typical *Larus* in this respect, to which it helps link the subgenus *Adelarus*. It also has more gray pattern in the wing than any of the other species of *Adelarus*, in this resembling *Larus*. It is also the only species of the group that has so northern a range.

The heaviness of the bill does not warrant the name *crassirostris*.

Subgenus **LARUS****Larus audouinii**

Audouin's Gull

Figures 62 to 66

Larus quadricolor SCOPOLI, 1769, Nat. Hist., I, p. 81.

Larus atricilla TEMMINCK, 1820, 'Man. d'Orn.,' p. 779.

Larus audouinii PAYRAUDEAU, 1826, Ann. Sci. Nat., VIII, p. 462 (Sardinia and Corsica).

Larus payraudei VIEILLOT, 1828, 'Faune Fran. Ois.,' p. 396, Pl. CLXXII, fig. 1.

DISTRIBUTION

Breeds on the islets of Sardinia and Corsica, and on the Columbrete Islands, Spain; probably not wandering far in winter but reported from Sicily, the Cyclades Islands, and the coast of Syria.

MEASUREMENTS¹

	MALES (5)	FEMALES (3)
Wing	370-400 (389.0)	382-402 (389.0)
Tail	138-151 (146.7)	140-158 (147.7)
Tarsus	52- 60 (58.2)	57- 60 (58.5)
Toe without claw	41- 45 (43.0)	41- 45 (43.0)
Culmen	43- 53 (48.9)	43- 47 (45.3)
Bill at base	15- 16 (15.2)	14.5- 15 (14.8)
Bill at angle	15-16.5 (15.8)	14.5- 15 (14.8)

MOULTS AND PLUMAGES

Natal Down

REFERENCE SPECIMENS.—J. D., No. 52764; June 1913; Isola della Vacca, Sardinia ("de 5 jour"). Tring Museum; May 25, 1902; same locality.

BACK, WINGS, AND FLANKS pale grayish buff with rather obscure dull clove-brown mottlings or cloudings. HEAD whiter, with bolder, blacker spots, arranged approximately in rows that run backward from the bill. UNDERPARTS buffy white, palest on the breast with a few (usually two) coarse black spots on the sides of the chin and lower down on the throat two more, the first pair sometimes lacking. BILL, in skin, dull black two-thirds of length, yellowish flesh at tip. LEGS AND FEET, in skin, yellowish brown. IRIS probably dark brown.

Not distinguishable from *argentatus*, possibly has a buffier tone.

Juvenal Plumage

No specimen examined. Probably resembles *fuscus*, but paler in tone, with more white in the tail and smaller.

Hartert (1921, p. 1738) gives the following description (translation): Top of head and neck, light whitish gray, the feather edges yellowish, back similar but browner. Wings and rump like *Larus argentatus cachinnans*. Tail feathers at base light whitish gray, not pure white as in *L. argentatus cachinnans*.

First Winter or Non-nuptial Plumage

No specimen examined.

Undoubtedly acquired by a partial postjuvenal moult in the fall, the back, head, throat, and breast becoming paler, the juvenal wings and tail being retained, the soft parts unchanged.

First Nuptial Plumage

No specimen examined.

Undoubtedly acquired by a partial prenuptial moult in the spring, the new feathers much like the old winter with the retained juvenal wings and tail showing much wear, and the soft parts little changed.

¹It would seem that the sexes are practically alike in size except for the larger bill of the male, but a larger series may show that some of the birds here included are wrongly sexed.

Second Winter or Non-nuptial Plumage

Figures 61 and 62

REFERENCE SPECIMEN.—Brit. M. (Saunders, No. 1811); ♂; February 1866; Palermo, Sicily. J. D., No. 56757; ♂; August 21, 1893; Sardinia; one old primary remaining.

Acquired by a complete postnuptial moult in the fall.

MANTLE pale neutral gray with practically no traces of immaturity. HEAD AND NAPE white, lightly streaked or obscurely spotted with dusky gray; eye-crescent dull black. UNDERPARTS white. WINGS: primaries dull black tipped with white increasing inwards (except the outer and sometimes the next), a gray tongue on the inner web of the seventh (sometimes obscurely on the eighth), larger tongues and the black reduced to a terminal band on the sixth, and a dusky spot on the fourth, the second to first gray; secondaries gray like mantle but with dusky spots on shafts especially on the inner; greater coverts gray with brown tinge, other coverts and wing-lining pale gray, axillars whiter; primary coverts black, gray-tipped. TAIL white with a little smudging and freckling of dull black. BILL, in skin, clay-color black-banded beyond nostril; edges of rami black, extreme tip grayish with red tinge. LEGS AND FEET, in skin, brownish black. IRIS brown.

Second Nuptial Plumage

REFERENCE SPECIMEN.—Brit. M., 1905.6.28.100; ♂; July 27, 1881; Maddalena Island, Sardinia.

Acquired by a partial prenuptial moult in the spring. New feathers on the back and about the head, throat, and breast freshen the winter plumage, the retained winter wings and tail becoming much worn.

BILL, in skin, pale yellow. LEGS AND FEET "black washed with ashy" (*ex label*); in skin, dull black. IRIS "brown" (*ex label*); eyelids, "red" (*ex label*).

Third Winter or Non-nuptial Plumage (Adult)

No specimen examined.

Acquired, doubtless, by a complete postnuptial moult in the fall. The plumage undoubtedly resembles the nuptial except that the head probably shows a few dusky streakings, and the bill and feet are duller in color.

Third Nuptial Plumage (Adult)

Figures 63 to 66

REFERENCE SPECIMEN.—A. H. Thayer; April 12, 1901; ♂; Isola Rossa, Sardinia.

Acquired by a partial prenuptial moult in the spring.

MANTLE pale neutral gray, much like *ridibundus*, but darker with a purplish tinge. HEAD AND NECK pure white. UNDERPARTS pure white. WINGS (retained from winter): primaries black, all with apical white spots and all with gray tongues (except as a rule the outer and the next, but sometimes also on both of these); the

outer with a small oval mirror, 10–12 mm. in diameter on the inner web; the four inner primaries wholly gray with white tips; primary coverts gray sometimes the outer with dusky shaft-streaks and webs, other coverts gray; secondaries gray with broad white tips, wing-lining and axillars grayish white, or pale gray. TAIL white (retained from winter). BILL carmine-red, a heavy black band beyond the nostril and angle, the tip yellowish; gape vermilion (*ex* color sketch by A. H. Thayer); in skin, the colors remain bright for years. LEGS AND FEET dark olive or leaden black with ashy gray tinge (Hartert). IRIS chestnut-brown with ochre-yellow reflections (H.), blackish brown, eyelids vermilion (*ex* sketch by Thayer).

The small series examined (seven adults and three younger birds) does not well illustrate the several plumages nor is much variation demonstrable. Four adults have one band on the bill, two have a double band, and one is an intermediate type. Another variation is in the size of the mirror or white spot, which is apparently always small and oval, on the first primary. The extent of the tongues is also variable; when the mirror is small, practically no tongues occur on the three outer primaries, but with increase in size of the mirror the tongues show on all except the outer.

This species seems to have a three-year cycle, but because of size there may be a considerable number of birds that fail to become entirely adult at the second postnuptial moult. Like *delawarensis*, this species is on the border line between species having a three-year and those having a four-year cycle.

SUMMARY

This local Mediterranean species has diagnostic characters of size, a very pale gray mantle, head (streaked in winter), tail and lower parts pure white, primaries with tongues and a small mirror, and a bright red larine bill with a black band. The young bird probably resembles *fuscus* very closely, though paler.

The species seems to be somewhat intermediate in its characters between the subgenera *Adelarus* and *Larus*, resembling the former group in the large banded bill and the latter in pale mantle and in the patterned primaries, although it leans towards the former in size and absence of mirrors except the very small one on the tenth primary.

Larus delawarensis

Ring-billed Gull

Plate XIV; Figures 67 to 78

Larus delawarensis ORD, 1815, in Guthrie's 'Geog.,' 2d Am. Ed., II, p. 319 (Delaware River below Philadelphia, Pennsylvania).

Larus canus BONAPARTE, 1827, 'Specchio Comp.,' p. 69.

Larus argentatoides BONAPARTE, 1828, Ann. Lyc. N. Y., II, p. 360.

Larus zonorhynchus RICHARDSON, 1832, in Swains. and Rich., 'Fauna Bor.-Am.,' II, p. 421.

Glaucus occidentalis BRUCH, 1853, Journ. für Orn., p. 101, Pl. II, fig. 20.

[*Gavina*] *bruchii* BONAPARTE, 1854, Naumannia, p. 212.

[*Larus zonorhynchus*] *a. mexicanus* BONAPARTE, 1857, 'Consp. Av.,' II, p. 224.

DISTRIBUTION

Breeds on islands in many of the lakes of Canada south of 60° from Labrador and Quebec to British Columbia, and those of the northern United States (the Great Lakes, and those of Michigan, Wisconsin, Minnesota, North Dakota, Oregon, Idaho, Colorado and Utah); in winter on both coasts of the United States south to Cuba, Texas and southern Mexico (Tehuantepec); accidental in the Bermudas and the Hawaiian Islands.

MEASUREMENTS

	MALES (13)	FEMALES (10)
Wing	347-392 (377.1)	335-370 (355.0)
Tail	140-162 (148.7)	134-149 (140.6)
Tarsus	54- 62 (57.9)	52- 58 (54.6)
Toe without claw	36- 42 (39.5)	35- 40 (37.3)
Culmen	39- 46 (42.4)	36- 43 (38.8)
Bill at base	12- 16 (13.6)	12- 15 (12.9)
Bill at angle	13- 16 (14.0)	12- 14 (12.9)

MOULTS AND PLUMAGES

Natal Down

REFERENCE SPECIMEN.—J. D., No. 16765; ♂; July 21, 1906; Maple Creek, Saskatchewan; with egg-tooth present.

BACK AND WINGS grayish white, clouded or lined with clove-brown. HEAD whiter with fairly clear, black spots. UNDERPARTS pale grayish white, a few dusky spots on sides of chin and on throat. BILL brownish black, the tip beyond angle whitish flesh-color (*ex label*); in skin, browner and duller. LEGS AND FEET "brownish black" (*ex label*); in skin, dull greenish black. IRIS deep brown (*ex label*).

Most resembles *argentatus*, but less buffy and without buff on the throat; not nearly so white in tone as *californicus* and lacks the distinctness of spotting on the head. It is strange that this brownish, comparatively dark chick should develop a much paler juvenal plumage, while the whiter *californicus* chick develops a very much darker juvenal stage.

Juvenal Plumage

Figures 67, 68 and 70

REFERENCE SPECIMENS.—J. D., No. 16761; ♂; July 21, 1906; Maple Creek, Saskatchewan; wings and tail about half-grown. J. D., No. 35401; ♂; August 9, 1913; Okanagan, British Columbia. J. D., No. 45768; ♂; October 17, 1899; Long Island, New York.

BACK AND MANTLE-AREA pale clove-brown with broad rich buff edgings, the brown in irregular partial bars, interrupted and incised with buff; rump and upper tail-coverts white, partly barred or spotted. HEAD dull white, thickly streaked with darker brown, the nape mottled or spotted; the feathers with edges and bases largely dull white with broad central areas of brown; eye-crescent black; eye-ring partial and dull white above and below eye posteriorly. UNDERPARTS chiefly white, the throat, breast, and sides spotted, each feather with a brown subterminal bar which often breaks up into two spots; those of the sides and crissum may be doubly barred; chin and adjacent region obscurely flecked. WINGS: primaries pointed, brownish black or deep clove-brown with faint white tips (except the outer two or three), the inner web of the tenth scarcely paler, the ninth somewhat paler, the rest with gray tongues crossing to the outer web, and usually at about the fifth becoming white, the fourth to third are gray with subterminal bands or spots, most marked on the fourth; primary coverts clove-brown, whitish tipped; secondaries clove-brown, often gray on inner webs, broadly edged and tipped with white, greater coverts clear gray or with a buff tinge, broadly edged with pale buff, each with a narrow dusky "watered" subterminal line and a shaft streak, the inner members and the tertials more mottled; other coverts like the back and the scapulars; edge of wing and lining white with dusky edgings, axillars grayer and more mottled like the back and scapulars. TAIL grayish white (sometimes grayer) more or less freckled with clove-brown, a broad subterminal band (35-40 mm.) and a white tip, the band often broken up toward the tips of the feathers into irregular dingy white areas and on the outer rectrix into bars or spots. The variation in freckling and in pattern is very great. BILL (see Pl. XIV, fig. 1) "distal two-fifths black, rest vinaceous buff, pinkish at gape, tip whitish" (*ex label*); in skin, browner at base. LEGS AND FEET (see Pl. XIV, fig. 1) "flesh-pink" (*ex label*); in skin, flesh-brown. IRIS (see Pl. XIV, fig. 1), "auburn, wood or Vandyke brown, eyelids black" (Bishop).

The buffs and browns soon fade and birds rapidly become very white. The bill, in skin, is largely black, brownish flesh at base of both mandibles with tip abruptly dull black beyond the nostril as if dipped into ink. The tail-pattern distinguishes juvenal birds resembling only that of *canus*, which is a much smaller species, less spotted below and with a pale brown (instead of gray) wing-band formed by the greater coverts.

First Winter or Non-nuptial Plumage

REFERENCE SPECIMENS.—J. D., No. 44608; October 27, 1900; Staten Island, New York. J. D., No. 29501; ♀; November 20, 1910; Ryer Island, Solano County, California.

Acquired by partial postjuvenal moult in August and September; wings and tail of the juvenal plumage retained.

BACK uniformly pale neutral gray, sometimes with a tinge of brown and occasional dusky smudges; new tail-coverts usually white. HEAD AND NECK whiter and less thickly streaked than in juvenal plumage and with grayer dusky spottings on the nape. UNDERPARTS largely white, the throat only with small rounded dusky spots, much of the brown of the old retained feathers elsewhere being lost by wear, (partly fading and partly abrasion). BILL AND SOFT PARTS like the juvenal.

Birds are unlike the juvenal stage, being mostly white below and pale gray on the back.

First Nuptial Plumage

REFERENCE SPECIMENS.—J. D., No. 44000; ♀; April 13, 1916; Seadrift, Texas. L. B. B., No. 33154; ♀; May 11, 1922; Los Angeles County, California.

Acquired by a partial prenuptial moult in March and April.

On the back new gray feathers are found among old gray ones with worn and bleached edges, new streaked feathers appear on the head and spotted ones on the nape, the dusky eye-crescent is rather conspicuous. Very few spots are left on the underparts partly from wear, partly from moult. The retained juvenal wings and tail become much worn and bleached. The bill shows a decided black band as the base and tip become somewhat yellowish; the gape reddens; the legs, feet and iris tend to become paler.

Second Winter or Non-nuptial Plumage

Figures 69 and 72

REFERENCE SPECIMENS.—J. D., No. 45769; ♀; October 27, 1897; Long Island, New York. J. D., No. 31393; ♂; January 13, 1892, Brownsville, Texas.

Acquired by a complete postnuptial moult in August and September, birds being as far advanced towards adult plumage as larger gulls of the third year.

MANTLE clear pale neutral gray, sometimes with traces of dusky markings. HEAD AND NECK white lightly streaked, becoming spotted on the nape, the forehead, lores and eye-ring white, the eye-crescent dusky and faint. UNDERPARTS white, lightly spotted or flecked on the throat and sides of neck, seldom on the sides. WINGS: primaries with rounded tips, otherwise much like the first winter although there is a trace of (or sometimes) a complete mirror on the outer primary, more often than in larger species, and the tongues are grayer and larger; primary-coverts and alula partly gray; secondaries and tertials largely gray with dusky shaft-streaks. TAIL largely (occasionally wholly) white with a terminal black band (about 25 mm.), the outer rectrix often white and the others often only with the spots chiefly on the inner webs. BILL "dull maize yellow, cream or light buff, distal quarter with black band, extreme tip yellow or white, gape orange or yellow" (Bishop); in skin, pale yellow-buff with black band and yellow tip. LEGS AND FEET "maize and sulphur-yellow or buff" (B.); in skin, yellowish flesh-brown often greenish tinged. IRIS "cream-color, naphthaline or sulphur-yellow" (B.).

Second Nuptial Plumage

REFERENCE/SPECIMEN.—A. M. N. H. No. 99077; ♂; July 11, 1906; Lower Klamath Lake, Oregon.

Acquired by a partial prenuptial moult in April and May.

The white head (rarely with faint streaks) is assumed; otherwise

much like the winter. Wings and tail of the winter retained. Bill and other soft parts brighter than in winter, the eyelids and gape red.

Third Winter or Non-nuptial Plumage (Adult)

Figures 71, 73 to 78

REFERENCE SPECIMEN.—J. D., No. 33597; ♂; November 11, 1912; Marin County, California.

Acquired by a complete postnuptial moult in August and September.

MANTLE pale neutral gray. HEAD AND NECK white with narrow streaking, the neck spotted. UNDERPARTS white. WINGS: primaries black, the outer and often the next with white mirrors of varying extent, and all with gray tongues extending on the seventh, sixth and fifth so that the black becomes a subterminal band, the rest gray with white tips; secondaries and tertials gray with broad white tips; primary-coverts gray sometimes with dusky shafts or a black edge on outer web of the distal feather; alula gray, edge of wing and lining white; all other wing-coverts gray. TAIL pure white. BILL (see Pl. XIV, fig. 2) "greenish or wax yellow with dull black band at the angle, the tip with a yellow or red tinge; gape orange" (Bishop). LEGS AND FEET (see Pl. XIV, fig. 2) "buff to yellowish drab" (B.); "gray green to bright yellow" (Brooks, *in epistola*). IRIS (see Pl. XIV, fig. 2) "dull to straw yellow; eyelids carmine" (B.).

It has been suggested to me that the variation in the color of the feet was geographical, but I do not think this is the case because both yellow feet and greenish feet occur in eastern as well as western birds. Similar variation is found in *Larus californicus* and *Larus canus brachyrhynchus*.

Third Nuptial Plumage (Adult)

REFERENCE SPECIMEN.—J. D., No. 16810; ♂; July 30, 1906; Maple Creek, Saskatchewan, Canada.

Acquired by a partial prenuptial moult not including wings or tail, in March and April.

Differs from the winter plumage only in having a pure white head. The bill is deep chrome-yellow; the eye-ring orange-vermilion and legs and feet chrome-yellow (Bishop).

SUMMARY

An inland North American gull in summer, spending its winters on the seacoast.

In adult plumage, the size, color of the mantle, banded larine bill, grayish-green legs and feet, and the primary pattern are characters not wholly shared by any other gull. In the juvenal and first winter plumages the tail is of a pattern similar only to that of *canus*, and the bill is similarly abruptly black-tipped but there is much more white in the

plumage, broader edgings and spottings and on the underparts only half bars or spots terminally on the feathers, while the wing-bar of the greater coverts is a clear gray. The bird of the first year is totally unlike *argentatus*, being much smaller, whiter, with the bill tip abruptly black, tail-pattern different and with a gray wing-bar. The adult has wing-pattern and tail resembling the *argentatus* group (*Larus*), the banded bill and colored feet showing its possible relationship to the *crassirostris* group (*Adelarus*), and it is similar in size to the latter species. It connects *Larus* with *Adelarus*, being intermediate in its characters, perhaps nearer the latter, but admittedly it is a question which characters are to be considered as the most important in allocating this species.

Larus canus

Pl. XIV; Figures 79 to 90

Larus canus canus—Common Gull; Mew

- [*Larus*] *canus* LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., I, p. 136 (Sweden).
Larus glaucus PONTOPPIDAN, 1763, 'Danske Atlas,' II, p. 622.
 [*Larus*] *maculatus* BRÜNNICH, 1764, 'Orn. Bor.,' p. 44.
Larus cinereus SCOPOLI, 1769, Hist. Nat., I, p. 80.
 [*Larus*] *hybernus* TUNSTALL, 1771, 'Orn. Brit.,' p. 3.
Larus procellosus BECHSTEIN, 1803, 'Orn. Taschenb.,' II, p. 373.
Larus cyanorhynchus MEYER, 1810, 'Taschenb. Vög. Deutschl.,' II, p. 480.
Laroides canescens BREHM, 1831, 'Vög. Deutschl.,' p. 753.
 [*Glaucus*] *lachrymosus* BRUCH, 1853, Journ. für Orn., p. 102.
Larus heinei HOMEYER, 1853, Naumannia, p. 129.
 [*Larus hybernus*] *a. ferroensis* BONAPARTE, 1857, 'Consp. Av.,' II, p. 223.
 [*Larus hybernus*] *b. islandicus* BONAPARTE, 1857, 'Consp. Av.,' II, p. 223.
Larus suckleyi SCHLEGEL, 1863, Mus. Pays-Bas, VI, No. 23 (Lari), p. 27.
Larus audouini TRISTRAM, 1864, Proc. Zool. Soc., London, p. 455.

Larus canus major—Asiatic Common Gull

- Larus niveus* PALLAS, 1826, 'Zool. Rosso-Asiat.,' II, p. 320.
Larus canus var. *major* MIDDENDORF, 1853, 'Reis. Sibir.,' II, part 2, p. 243, Pl. XXIV, fig. 4 (Southeastern Siberia).
Gavina kamtschatchensis BONAPARTE, 1854, Naumannia, p. 212.

Larus canus brachyrhynchus—Short-billed Common Gull

- Larus brachyrhynchus* RICHARDSON, 1831, in Jameson's 'Wilson's Ornith.' ('Constable's Miscell.,' LXXXI), IV, p. 352 (Fort Franklin, Great Bear Lake, Canada).
Larus canus SWAINSON AND RICHARDSON, 1832, 'Fauna Bor.-Amer.,' II, p. 420.
Larus suckleyi LAWRENCE, 1857, Ann. Lyc. Nat. Hist. N. Y., VI, p. 264.
Rissa septentrionalis LAWRENCE, 1857, Ann. Lyc. Nat. Hist., N. Y., VI, p. 265.

MEASUREMENTS
MALES

	No. of Skins	Wing	Tail	Tarsus	Toe Without Claw	Culmen	Bill at Base	Bill at Angle
<i>canus</i>	7	335-385 (357.3)	124-148 (138.7)	48-58 (52.3)	34-39 (36.7)	31-38 (34.4)	10-11 (10.8)	10-11 (10.6)
<i>major</i>	7	364-377 (369.0)	147-154 (150.8)	54-58 (55.9)	39-42 (40.9)	36-42 (39.0)	11-13.5 (12.4)	11-12.5 (11.9)
<i>brachyrhynchus</i>	12	334-366 (350.5)	130-148 (139.9)	48-53 (51.0)	37-41 (38.3)	33-38 (35.4)	10-11.5 (10.5)	10-11.5 (10.8)

FEMALES

<i>canus</i>	9	320-365 (340.8)	125-147 (133.3)	48-54 (50.2)	32-38 (35.4)	30-37 (32.6)	10-11 (10.2)	10-11 (10.2)
<i>major</i>	6	340-362 (351.2)	133-147 (140.6)	49-54 (51.5)	36-40 (36.8)	35-42 (37.5)	11-12 (11.6)	11-12 (11.6)
<i>brachyrhynchus</i>	11	328-352 (337.5)	128-141 (134.1)	47-51 (48.6)	35-39 (36.4)	30-35 (32.4)	9-11 (9.9)	9-11 (10.0)

DISTRIBUTION

The breeding range of true *canus* covers the northern parts of Europe and western Siberia, including the British Isles and adjacent islands, Holland, Denmark, Scandinavia and Russia. In winter the range is usually south to the Mediterranean Sea and the Persian Gulf, and stragglers have reached the Canary Islands, Iceland, and Egypt.

The breeding range of *major* is eastern Siberia east of the Lena River, probably chiefly on the east coast. In winter the range is to the Japan and China coasts and as far south as Formosa.

The breeding range of *brachyrhynchus* is northwestern North America from northern British Columbia north in Athabaska, Mackenzie, Yukon and Alaska to the Arctic Ocean. In winter on the Pacific coast of the United States south to San Diego, California; casual in Quebec and Wyoming.

MOULTS AND PLUMAGES

Natal Down

REFERENCE SPECIMENS.—L. C. Sanford, No. 9172; ♂; May 26, 1908; Orkney Islands. A. C. Bent, No. 8021; June 15, 1915; St. Michaels, Alaska. L. B. B., No. 4292; ♀; July 2, 1892; Lake Marsh, Yukon.

BACK AND WINGS dark buff with dull black spots or blurred lines extending to the flanks. HEAD similar but with spots more distinct in rows running from the bill backwards, usually forming a large occipital spot surrounded by an irregular circle of lesser spots. UNDERPARTS buff, palest on breast, unmarked except a few spots at sides of chin and across the throat. BILL (*brachyrhynchus*) "brownish black tipped with whitish" (Bishop); in skin, flesh-brown base, merging into dull black tip and cutting edges. LEGS AND FEET "pale clay-color, rings of tarsi and toes hair-brown" (B.).

Resembles closely *Larus occidentalis livens* but paler legs and feet; one of the darkest of the group, with the darkest spots.

Juvenal Plumage

Figures 79 to 82

REFERENCE SPECIMENS.—J. D., No. 53058; ♂; August 25, 1922; Lancashire, England. A. M. N. H., No. 76728; August 21, 1900; Gichiga, Siberia. J. D., No. 52841; ♀; August 16, 1921, Okanagan, British Columbia.

BACK AND MANTLE-AREA pale clove-brown, the feathers with rather narrow pale buff edgings, broader on scapulars and tertials, with no barring, and seldom with a mottled or watered appearance; rump and tail coverts white-barred or spotted with brown. HEAD grayish white, obscurely streaked or like the nape almost solidly brown with slight buffy edgings; forehead and sides of head paler; inconspicuous eye-ring, grayish white; eye-crescent, black. UNDERPARTS grayish clove-brown, often much whiter and when fresh more solid in color, soon becoming through wear more or less obscurely mottled; the feathers are chiefly white with an irregular subterminal bar or

mottling and sometimes a partial second bar, the flanks and crissum with scattered and coarser barring; a little disarrangement brings into view the basal white and tends to give a streaked, barred or mottled effect; chin and upper throat white slightly but more or less flecked; throat streaked. WINGS: primaries, deep clove-brown, the inner webs of from about the eighth or the seventh growing paler, the obscure pattern growing more defined and increasing inwards on successive quills, the tips increasingly grayish white from about the seventh; primary coverts deep clove, grayish tipped; secondaries paler with grayish edgings, and basally grayish; tertials browner with broader margins; greater coverts grayish drab faintly edged; median and lesser coverts like the back, the edgings perhaps a deeper buff; edge of wing and lining grayish white, more or less heavily edged with brown, axillars grayer and barred. TAIL basally gray (or white) narrowly tipped with buffy white, often much freckled with brown, for about two-thirds, and then with a broad clove-brown (sometimes blacker) terminal band, least on the outer rectrices, the distal pair with much white, basally and the outer web with coarse irregular spotting and freckling. BILL (*brachyrhynchus*) (see Pl. XIV, fig. 3) "flesh-colored base, dull black or olive-brown beyond angle, gape ochraceous" (Bishop); in skin, dull black beyond nostrils merging into flesh-brown base. LEGS AND FEET (see Pl. XIV, fig. 3) "flesh-colored with a slight bluish tinge; pale vinaceous buff, gape ochraceous" (B.); in skin, dull yellowish brown. IRIS (see Pl. XIV, fig. 3) "raw umber or Prout's brown, eyelids black" (B.); "grayish brown" (Brooks, *in epistola*).

In specimens of the American *brachyrhynchus* and of the Siberian *major* the tail is largely dusky and freckled or smudged at the base leaving only a partial narrow white band on the two or three middle pairs of rectrices, showing just beyond the tips of the upper coverts; in specimens of the European *canus* the basal portion is white rather than gray, and seldom freckled. The tail-pattern separates *canus* from all other gulls except *delawarensis*, which is larger, has much whiter and more spotted underparts and very gray instead of drab greater coverts. The back resembles in tone and pattern that of *schistisagus* and the underparts those of *occidentalis*. The races *major* and *brachyrhynchus* are both rather darker, especially the underparts, than true *canus*, which is largely white below but indistinguishable specimens are found. The head and neck of *brachyrhynchus* is usually more solidly brown, the streaks fused and obscure. The heads are alike in *canus* and *major*; the underparts alike in *major* and *brachyrhynchus*.

First Winter or Non-nuptial Plumage

REFERENCE SPECIMENS.—J. D., No. 14179; ♀; November 12, 1900; Hadsund, Denmark. J. D., No. 32982; ♀; November 16, 1912; Pacific Grove, California.

Acquired by a partial postjuvenal moult in August and September.

BACK chiefly gray, some of the feathers brownish; rump white, sometimes slightly barred or spotted. HEAD whiter than the juvenal and more narrowly and distinctly streaked on the crown, and occiput, with a paler brown, the streaking or

spotting on the nape more diffused. UNDERPARTS almost wholly white but spotted or barred rather lightly on throat, sides of neck and sides. WINGS AND TAIL of juvenal plumage retained showing much wear. BILL AND OTHER SOFT PARTS much like the juvenal.

First Nuptial Plumage

REFERENCE SPECIMEN.—L. C. Sanford, No. 3432; ♂; May 24, 1911; Campbell Island, British Columbia.

Acquired by a partial prenuptial moult, not including wings or tail, in March, April and May. Resembles the first winter, the mantle a clearer gray, and the head and throat whiter with less streaking. Wings and tail of the juvenal plumage retained worn and faded.

BILL (*brachyrhynchus*) "pale olive-gray base, black beyond nostrils; gape pale orange-buff" (Bishop). LEGS AND FEET "pale olive-gray" (B.). IRIS "Verona-brown" (B.).

Second Winter or Non-nuptial Plumage

Figures 83 and 84

REFERENCE SPECIMENS.—A. M. N. H., No. 76733; ♂; October 3, 1900; Gichiga, Siberia. J. D., 31047; ♂; February 12, 1911; Humboldt Bay, California.

Acquired by a complete postnuptial moult in August and September.

BACK AND MANTLE-AREA mostly gray like the adult, but browner on the wings, the lesser coverts solidly wood-brown, the tertials deeper brown and somewhat mottled with broad white or grayish edgings. HEAD white, streaked with clove-brown, the forehead and lores merely flecked, the nape heavily clouded; narrow black eye-crescent and lines below and behind eye. UNDERPARTS white, more or less spotted or indistinctly barred especially on the throat with pale clove-brown. WINGS: primaries rounded, brownish black without white tips, the outer with (sometimes without) a large white rather blurred mirror and sometimes a small mirror also on the ninth; the seventh and sixth show long tongues of gray, the fifth and fourth have both webs with tongues more or less brownish gray and the tips brown, diminishing to a faint band on the third which, with the second and first are usually gray with white tips; primary coverts and alula clove-brown, darkest on inner webs, faintly gray-tipped. Secondaries gray like mantle, broadly white-tipped; tertials browner with dusky areas along the shafts; greater coverts, drab or grayish; lesser coverts still browner, the median row gray. Wing-lining and axillars are chiefly white with brown edgings, giving a scalloped effect. TAIL largely, sometimes entirely, white, with smudges varying from one or two small black spots or edgings to a well-marked subterminal black band, the outer and mid-pair of the rectrices least marked, and often wholly white. BILL (*brachyrhynchus*) "grayish blue-green, plumbeous or olive-buff, tip dull, black, gape orange" (Bishop); in skin, much duller. LEGS AND FEET "pale grayish blue-green or pearl gray, yellower webs" (B.); in skin, greenish or yellowish brown. IRIS "brown, buffy or burnt umber, eyelids black" (B.).

Second Nuptial Plumage

REFERENCE SPECIMENS.—A. M. N. H., No. 76734; ♂; May 31, 1901; Gichiga, Siberia. A. M. N. H., No. 119105; ♀; June 7, 1910; Mackenzie River delta (per-

haps a backward third nuptial). J. D., No. 16494; ♂; June 1, 1906; Monterey, California.

Acquired by a partial prenuptial moult in March and April.

New gray on the back and new white about the head and lower parts; a few brown-edged feathers sometimes come on the head and throat which are somewhat faintly spotted and streaked. The bill is often nearly or quite yellow and the black largely gone, the legs and feet are greener, the gape brighter. Wings and tail of winter retained becoming much worn.

Third Winter or Non-nuptial Plumage (Adult)

Figures 85 to 90

REFERENCE SPECIMENS.—J. D., No. 52861; ♂; January 9, 1922; Lancashire, England.

Acquired by a complete postnuptial moult in August and September.

MANTLE light neutral gray. HEAD AND NECK white, streaked and flecked on crown and occiput, the latter darker, the lores and forehead white; eye-crescent dusky. UNDERPARTS pure white. WINGS: primaries black with broad white tips, the tongues gray extending to outer web usually on the eighth, reducing the black to a subapical band on the sixth and fifth, the fourth gray with a white tip or a partial indistinct bar or spot, and the fifth sometimes is only partly barred. The gray extends to the outer web on the eighth beyond the tips of the primary coverts which often show dusky shaft areas. TAIL white. BILL (*brachyrhynchus*) (see Pl. XIV, fig. 4); "straw or greenish yellow, yellower beyond angle and on maxilla" (Bishop). LEGS AND FEET (see Pl. XIV, fig. 4) "dull straw or greenish yellow or pea-green, varying greatly in color" (B.). IRIS (see Pl. XIV, fig. 4) "pale brown or raw umber" (B.).

In *brachyrhynchus* the tongue on the eighth primary is usually longer and whiter at the end than in *canus*; the gray usually extends to the outer web of the ninth primary at a point beyond the tips of the primary coverts instead of to the web of the eighth as in *canus*; in other words, there is more gray and less black in the wing than in *canus*. An occasional specimen of *canus* has three mirrors, a condition that does not seem to occur in *major* or in *brachyrhynchus*, the darkest of the races.

A similar variation in color of feet, apparently not geographical, is found in *californicus* and *delawarensis*.

Third Nuptial Plumage (Adult)

REFERENCE SPECIMENS.—J. D., No. 11488; ♂; July 2, 1904; Cowichan, British Columbia. A. M. N. H., No. 76735; ♂; June 24, 1901; Gichiga, Siberia.

Acquired by a partial prenuptial moult, not including wings or tail, in March and April.

Like the third winter except for a pure white head. Bill, legs and feet olive-yellow, eyelids vermilion (Witherby).

Birds are adult in their third year, having a three-year plumage-cycle, as might be supposed from their size (a few backward birds excepted); and mirrors and apical spots are apparently as large at this period as they are in later years.

SUMMARY

A widely ranging species with a representative race in Europe, Asia, and North America, respectively.

Three geographical races of *canus* have been recognized; *major* large, with obviously large bill, and with a slightly darker mantle; *brachyrhynchus* the smallest with a paler mantle; and *canus* nearly the size of *brachyrhynchus* with a similar pale mantle but showing in the wing more white.

In juvenal and the other first-year plumages *major* and *brachyrhynchus* both have tails with the dark band wider and less sharply set off from the basal white, which oftener has a gray tinge than in *canus*; and they also, as a rule, have less white in the underparts, being darker in tone everywhere.

The type of *Larus suckleyi* (Lawrence, 1857, Ann. Lyc. Nat. Hist., N. Y., VI, p. 264) taken on Puget Sound, Washington, is in the U. S. Nat. Mus. collection (No. 4571 *bis*), where I have examined it. It is, of course, *brachyrhynchus*, as was pointed out many years ago.

The type of *Rissa septentrionalis*, taken at Bellingham Bay, Washington, July 30, 1856, is also in the U. S. Nat. Mus. collection (No. 6471). This bird has been properly identified long ago as *brachyrhynchus*. I find on examination that this specimen has a well-developed hind toe and claw which *Rissa* usually lacks.

The type of *Larus brachyrhynchus* is in the U. S. Nat. Mus. (No. 6262, May 23, 1886, Great Bear Lake, Mackenzie, Canada).

The Common Gull or Mew of Europe is one of the six gulls known to Linnæus in 1758 and was placed by him in the genus *Larus*. It has had a checkered nomenclatural career, into which it is hardly necessary to go. The synonyms are many, as the birds in their several plumages have been mistaken for other species or named as new.

Larus canus, according to the 'A. O. U. Check List' (3rd Ed., 1910), was made type, by subsequent designation, of the genus *Larus* (Gray, 1855). This has proved to be an erroneous view and it is perhaps fortunate because it is one of the few aberrant species of the restricted subgenus *Larus* if my analysis of the group be correct. It agrees with them in shape of bill, mirrored primaries, and other details, but it is the only

species among them without the red spot on the bill in the adult and having in the young bird a semi-banded tail-pattern that approaches that of the hooded gulls. In the latter respect, in size, and in the abruptly black-tipped bill it resembles *delawarensis* alone, to which it seems to be most closely related.

The claim of *Larus canus* to a place in the North American fauna has long rested on a specimen taken in Labrador in 1860 by Elliott Coues and later sent to Howard Saunders of the British Museum who recorded it as "*canus*" (Proc. Zoöl. Soc., 1878, p. 178) and returned it to the U. S. National Museum where it has been ever since. Later writers, even Ridgeway (1919), accepted the record as valid although it had been questioned. I have recently examined this specimen (U. S. Nat. Mus., No. 18222, Henley Harbor, Labrador, August 1921) and can definitely state that the bird is not *canus* but *delawarensis*. It is in worn juvenal plumage and measures in millimetres as follows: wing, 362; tail, 143; tarsus, 56; middle toe, without claw, 41; length of bill, 37; depth of bill at base, 12; at angle, 11. These dimensions indicate a bird larger than the average *canus* and the stoutness of the bill is that of *delawarensis*, not the more slender shape of *canus*. In the next place the tone of the brown feathers is deeper and there is much more brown than in *canus*, the head heavily streaked, almost solid in color where *canus* is white with spotting or grayish streaking. The underparts are more spotted, streaked and barred than *canus*, even the flanks and under tail-coverts are partly barred while they are white or faintly spotted in *canus*. The wing-band of this specimen is the gray band of *delawarensis*, not the browner one of *canus*. Finally the tail has less white and is more freckled than *canus* which frequently lacks obvious freckling; the coverts too, both upper and under, are distinctly barred while those of *canus* are either faintly spotted or entirely white. It is most surprising that nobody has ever settled the identification of this specimen which has been accepted as *canus* for over fifty years. There are many questions that can be settled when we take the trouble to do it.

Larus argentatus

Plate XI; Figures 91 to 108

Larus argentatus argentatus—European Herring Gull

Larus argentatus PONTOPPIDAN, 1763, 'Danske Atlas,' I, p. 622 (Denmark).

Larus maximus HERMANN, 1783, 'Tab. Aff. Anim.,' p. 146.

Larus cinereus BODDAERT, 1783, 'Tabl., Pl. Enl.,' p. 15.

Larus fuscus PENNANT, 1788, 'Brit. Zool.,' 2d Ed., II, p. 131.

[*Larus marinus*] β LATHAM, 1790, 'Index Orn.,' II, p. 814.

Larus glaucus RETZIUS, 1800, 'Fauna Suecica,' I, p. 156.

Larus argenteus BOIE, 1822, Isis, p. 562.

Larus argentatoides BREHM, 1822, 'Beitr. Vogelk.,' III, p. 791.

Larus argentaceus BREHM, 1824, 'Lehrb.,' p. 710.

L[aroides] major BREHM, 1830, Isis, p. 993.

Larus jacksoni 1839, [Couch's 'Hist. Cornwall,' p. 28], Ann. Nat. Hist., III, p. 381.

Larus argentatus smithsonianus—American Herring Gull

Larus marinus LEMBEYE, 1850, 'Aves de Cuba,' p. 122.

Larus occidentalis MARTENS, 1859, Journ. für Orn., p. 222.

Larus smithsonianus COUES, 1862, Proc. Acad. N. S., Phila., XIV, p. 296.

Larus argentatus vegæ—Vega Herring Gull

Larus argentatus MIDDENDORFF, 1851, 'Reis. Sibir., Zool.,' p. 242, part.

?*Glaucus borealis* BRUCH, 1853, Journ. für Orn., p. 101.

Larus argentatus var. *cachinnans* SCHRENCK, 1859, 'Reis. Amurl.,' I, p. 504.

?*Larus fuscus* SWINHOE, 1860, Ibis, p. 68.

Larus occidentalis, SWINHOE, 1863, Proc. Zoöl. Soc., p. 326.

Larus affinus NELSON, 1883, 'Cruise "Corwin" in 1881,' p. 107.

Larus argentatus BRÜNN var. *vegæ* PALMÉN, 1887, 'Bidr. Sibir. Vogelf. "Vega"-Exped., Vetensk.,' V, p. 370. (Pidlin, coast of N. E. Siberia.)

Larus argentatus thayeri—Thayer's Herring Gull

?*Larus americanus* BREHM, 1830, Isis, p. 993.

?[*Larus*] *chalcopterus* LICHTENSTEIN, 1854, 'Nom. Av. Mus. Berol.,' p. 99.

Larus argentatus SABINE, E. 1821, 'Parry's First Voy.,' App., p. cciv.

Larus argentatoides SWAINSON AND RICHARDSON, 1832, 'Fauna Bor.-Am.,' II, p. 417.

Larus kumlieni Murdoch, 1885, 'Expd. Pt. Barrow,' p. 123.

Larus thayeri BROOKS, W. S., 1915, Bull. Mus. Comp. Zoöl., LIX, p. 373 (Buchanan Bay, Ellesmere Land).

Larus argentatus TAVERNER, 1917, 'Rep. Geol. Surv., Canada for 1916,' p. 356.

DISTRIBUTION

The breeding range of the geographical race *argentatus* includes the coasts and islands of northern Europe embracing northern France, the British Isles, Faroë Islands, Holland, Denmark, Scandinavia, the shores of the Baltic Sea and northern Russia eastward to the White Sea. Here apparently a gap occurs until the Taimyr Peninsula is reached, where the race *vegæ* is found extending eastward along the Siberian coast to Anadyr Bay. The race *smithsonianus* breeds in the interior and along the southern coast of Alaska, and adjacent portions of British Columbia and on the lakes of southern Canada and the northern border of the United States to the Atlantic coast, where colonies occur from Maine to northern Labrador and Hudson Bay. The race *thayeri* breeds north of Hudson Bay to Ellesmere Land and west in the Arctic archipelago to Banks Land.

MEASUREMENTS
MALES

	No. of Skins	Wing	Tail	Tarsus	Toe Without Claw	Culmen	Depth at Base	Depth at Angle
<i>argentatus</i>	10	395-447 (415.0)	163-189 (173.2)	60-70 (65.5)	51-59 (54.0)	48-58 (52.5)	17-19 (18.1)	18-21 (19.3)
<i>smithsonianus</i>	19	405-460 (433.8)	151-190 (175.2)	60-74 (67.8)	50-60 (55.1)	49-62 (57.0)	17-22.5 (19.5)	18-22 (20.3)
<i>vegæ</i>	17	420-453 (439.7)	167-187 (179.1)	63-75 (69.5)	52-60 (56.6)	51-60 (55.9)	16.5-21 (19.1)	17-22 (19.7)
<i>thayeri</i>	12	410-430 (418.3)	163-175 (168.8)	62-68 (63.7)	51-56 (53.9)	49-57 (52.2)	16.5-20 (18.5)	16.5-20 (18.1)

FEMALES

<i>argentatus</i>	8	375-392 (383.8)	152-163 (156.1)	55-62 (58.1)	45-51 (47.4)	45-50 (47.4)	14.5-16 (15.3)	15-17 (16.0)
<i>smithsonianus</i>	16	397-422 (410.6)	154-178 (165.3)	57-66 (62.1)	47-53 (50.2)	47-53 (50.1)	16-18 (17.0)	17-20 (18.0)
<i>vegæ</i>	5	410-435 (422.3)	158-175 (166.6)	63-68 (65.6)	50-55 (53.0)	49-52 (51.0)	16.5-19 (17.5)	16.5-20 (18.5)
<i>thayeri</i>	12	380-405 (395.0)	145-165 (156.8)	58-65 (60.3)	47-54 (50.4)	43-56 (48.4)	14-19 (16.2)	15.5-17.5 (16.5)

In winter *argentatus* frequents the Mediterranean, Black, and Caspian Seas reaching the northern coast of Africa and less frequently the Canary Islands; *vegæ* reaches the coasts of Japan and China and as far south as the Bonin Islands, and the Gulf of Tonquin and also occurs on the coasts of Alaska to the Aleutian Islands; *smithsonianus* winters on both coasts of the United States, most abundantly on the eastern, sometimes casually reaching the Bermuda Islands, the Bahamas, Cuba, Florida, Texas, Yucatan, and the west coast of Mexico to Tepic and the Tres Marias Islands; and *thayeri* is found on the Pacific Coast from British Columbia to southern California.

MOULTS AND PLUMAGES

Natal Down

REFERENCE SPECIMENS.—A. M. N. H., No. 75366; June 17, 1901; Shoal Lake, Manitoba. A. C. Bent, No. 8442; July 11, 1915; Heron Island, Maine. F. S. Hersey, No. 3067; June 3, 1914; Wales.

BACK buffy grayish white, rather coarsely lined, spotted and clouded with blurred clove-brown in fairly regular longitudinal lines. HEAD a very little whiter than the back with more distinct dull black spots, irregular in size but arranged in regular longitudinal rows. UNDERPARTS grayish white, palest on chin and throat, buffy on the throat and unmarked except for spots on sides of chin and an obscure speckling or clouding on the sides, posterior abdomen and crissum. WINGS: grayish like the back with a dusky spot at the shoulder and two blurred bars across the forearm. BILL horn-color with a pink tip (Bent); in skins, brownish black, the tip beyond the angle brownish flesh, the egg-tooth whiter; in very young birds the soft and wrinkled paler base hardens before the egg-tooth is absorbed. LEGS AND FEET dusky pink; in skin, usually a dark yellowish brown. IRIS "dark brown" (*ex label*).

The races of *argentatus* at this stage are not separable, judged by the specimens examined, although larger series may disclose shades of difference. The chicks should be at an absolutely comparable stage. The down, when fresh, is more distinctly buff, a color that quickly fades to dingy white. There are a number of species of gulls that scarcely differ from one another when in the natal down. The variations are discussed on p. 97.

Juvenal Plumage

Figures 91 to 94

REFERENCE SPECIMENS.—A. M. N. H., No. 26238; ♂; August 20, 1884; Ungava, Canada. J. D., No. 7667; ♀; August 6, 1901; Tadousac, Quebec. A. M. N. H., No. 1084; ♀; September 6, 1878; Devon, England. L. B. B., No. 31595; July 8, 1917; Kolyma Delta, Siberia. And many others.

BACK AND MANTLE-AREA pale clove-brown, the feathers more or less broadly edged, notched and inconspicuously barred with very pale buff, many of the tips

having a "watered" effect as if the darker colored bars had run; interscapular region darker because of narrower edgings. HEAD similar in tone, thickly and indistinctly streaked with grayish white and pale clove-brown, the feathers centrally dark with whitish edgings, paler on forehead and on sides; eye-crescent dull black; hind-neck as it blends into the back, much darker, because the edgings are narrower or sometimes absent; feathers basally dingy white. UNDERPARTS clove-brown, rather grayer than the back, more or less obscurely mottled or barred; the feathers basally white with partial bars and edgings that wear away and fade producing a more spotted effect; the chin is dull white usually more or less faintly streaked and flecked with brown, the streaking coarser and more pronounced on the throat but lost in the nearly solid brown of the breast; posterior abdomen and under tail-coverts are somewhat whiter and more distinctly barred, especially the later. WINGS: the primaries are somewhat pointed, often as if they had been pinched at the tips, never much rounded; viewed from above they are deep clove-brown, from below a glossy gray, darkest toward the tips and on the outer webs; on the inner webs along a line parallel to the shafts they seem to grow abruptly paler; the narrowed barbules at this point and beyond permitting more light to pass, the inner four or five primaries at their tips and on the inner webs become increasingly pale, the tips often faintly buff or grayish white; the primary coverts and the alula are similar to the primaries, the secondaries usually paler with marked buff or grayish edgings and mottled or "watered" toward the tips, especially the inner; the tertials and the wing-coverts are mottled like the back or more boldly, the lesser coverts darker because of narrow edgings; the edge of the wing, the wing-lining and axillars are clove-brown, the shafts pale and the webs more or less distinctly spotted or barred with buff; the under greater or reversed coverts are glossy gray like the adjacent flight-feathers. TAIL: the rectrices are more or less distinctly rounded at their tips, and deep clove-brown like the primaries with coarse irregular transverse white barring towards their bases, the amount and distribution of the white extremely variable although regularly increasing in amount from the middle pair outwards, and perhaps most conspicuous in the jagged spots on the outer web of the distal pair of rectrices, the outer webs of the next pair frequently grayer in marked contrast. Tails vary from those with little more than a basal sprinkling of white to those in which the dark bars have broken up into irregular lines or spots scattered on considerable areas of white chiefly basal and on outer webs of the outer pair of rectrices. But extreme whiteness is rare in American *smithsonianus* while it is the rule in European *argentatus* which has spotting more often than barring. The pattern is never quite symmetrical on the two halves of the tail. BILL (see Pl. XI, fig. 1, *thayeri*), "black, basal third or less, drab to fawn or pinkish; gape pale vinaceous fawn" (Bishop); in skin, about two-thirds black merging into basal yellowish or umber-browns. LEGS AND FEET (see Pl. XI, fig. 1) "pale vinaceous fawn or flesh-color" (B.); in skin, pale and yellowish with age, usually various indefinite yellowish or dusky browns. IRIS (see Pl. XI, fig. 1) "sepia or dark brown; eyelids dark hair-brown" (B.).

The natal down is gradually worn away from the feather tips of the juvenal plumage, which is usually fully developed early in August, remaining stable for a month or two, when the leisurely postjuvenal moult begins.

Variation is chiefly in two directions: (1) in tone, lighter or darker, which may be due either to the shade of the brown, to the width of the feather edgings, or to both; (2) and in tail-pattern.

The geographical races at this stage differ but slightly one from the other; *vegæ* is practically indistinguishable from the others, although it may perhaps average darker in tone; *thayeri* can be recognized when the specimen has slaty black primaries (they are usually quite black), and by the small size, especially the small bill; *smithsonianus* averages darker in tone everywhere than true *argentatus*, the white areas of the tail are usually considerably smaller and the size, especially of the bill, is larger; and true *argentatus* is whitest in tone and with spotting rather than barring on the larger white areas of the tail.

To identify a juvenal *argentatus*, all of the species with wings measuring under (and usually well under) 380 mm. may be ruled out on size alone. Four may be ruled out by their generic characters, viz., *Creagrus*, *Gabianus*, *Leucophæus* and *Pagophila*. Of the remaining large or moderately large species, *hyperboreus*, *leucopterus*, and *glaucescens*, differ from *argentatus* in having drab or nearly white (instead of black or deep brown) primaries and tails; *marinus* is marked by a peculiar "waved" or "watered" tail-pattern; *schistisagus* has a buff tone, a drab wing-band and a whiter tail partly streaked longitudinally and usually spotted instead of barred; *dominicanis*, *fuscus*, *cachinnans* (and probably *audouini*) have tails with much white basally, sparsely spotted rather than barred; *occidentalis* has a dark tone, a heavy wholly black bill and a tail almost solid in color or with only faint white basal frecklings; *californicus* has a sharply defined black tip to the bill; and *canus* and *delawarensis*, seldom large enough to be mistaken for *argentatus*, also have similarly defined black-tipped bills combined with obscurely broad-banded tails quite unlike the pattern of any of the others.

First Winter or Non-nuptial Plumage

REFERENCE SPECIMENS.—J. D., No. 10781; ♀; December 22, 1903; Long Island, New York. J. D., No. 53177; ♂; January 3, 1923; Fleetwood, England.

Acquired by a partial postjuvenal moult limited entirely to the body and chiefly to the anterior parts including the head, neck, breast, and sides, the rest of the plumage becoming worn and faded, the wings and tail retained. A rather slow and incomplete replacement begins in the average bird in September, October, or November (rarely as late as mid-winter) and ends usually by December or sometimes later. In a certain proportion of birds the postjuvenal overlaps the prenuptial moult.

BACK brown and mottled much like the juvenal, but the paler broader edgings more fused into the brown which is less in extent on the individual feathers. HEAD, THROAT, AND BREAST with the new feathers much like the old, perhaps averaging a little whiter, and more broadly and distinctly streaked. WINGS AND TAIL of the juvenal plumage are retained, gradually fading browner with whiter edgings through wear. BILL: the black diminishes a little toward the base, but the fused or blended effect remains, the base and the extreme tip pale and there is no obvious band. OTHER SOFT PARTS practically unchanged from the juvenal.

Birds are found in moult from September to May. Worn feathers and new ones are found side by side during the whole winter, so that it is impossible to fix accurately the limits of the postjuvenal moult for the reason that the new brown feathers, particularly of the back, are often like the old, although they usually have diminished brown areas or are somewhat paler with broader, less contrasting, edges. Wear is the factor that fades the feather edges and removes them in part, so that birds look whiter, more irregularly mottled on the back and adjacent parts and more distinctly spotted or barred on the underparts as the deeper markings in contrast to the basal white are exposed. So it is that a bird solidly brown on the lower parts in juvenal plumage may become through wear alone, without any moult, much whiter and distinctly barred, as may be observed in many winter specimens. Usually the fresh winter plumage is a little whiter than the juvenal, especially about the head and breast, while the new feathers of the back have the paler edgings and mottlings fused into the brown (usually paler) central area giving a less mottled and more solid effect in contrast to the older worn wing-coverts adjacent.

First Nuptial Plumage

REFERENCE SPECIMEN.—J. D., No. 44606; ♀; May 30, 1906; New York.

Acquired by a partial prenuptial moult in March, April, and May, a third generation of brown or chiefly brown feathers growing on the back, the head, and anterior parts of the body. Birds do not breed in this plumage.

BACK like the first winter, or sometimes paler, with suggestions of gray. HEAD AND NECK whiter than in the first winter but still much streaked. UNDERPARTS whiter, especially on chin and throat. WINGS AND TAIL of the juvenal plumage are retained, becoming worn, bleached and ragged, doubtless because of a deficiency of pigment in these early feathers. BILL AND SOFT PARTS practically unchanged.

Second Winter or Non-nuptial Plumage

Figures 95 and 96

REFERENCE SPECIMENS.—J. D., No. 23505; ♀; August 31, 1909; Tadousac, Quebec. J. D., No. 4720; ♀; November 9, 1897; New York. J. D., No. 49089; September 1, 1909; England.

Acquired by a complete postnuptial moult in August, September, and October.

BACK AND MANTLE-AREA brown, mottled much like the first winter, but with a finer speckled or peppered effect and usually silvery gray or partly gray feathers on the back, varying greatly both in the amount of color in individual feathers and in the area involved. HEAD usually decidedly whiter than in the first winter, heavily streaked, still more broadly streaked and clouded on the neck. The whiteness is largely due to the diminished extent of the brown of each feather and to the broader edgings. UNDERPARTS whiter than in the first winter, the chin unmarked, the throat rather coarsely streaked, elsewhere more solidly blurred or clouded with brown mostly without the mottling of the first winter. The brown of the individual feathers is more or less diminished or diluted and some specimens are largely white with only a clouded area on the abdomen and a few streaks on the throat. This extreme whiteness is more frequent in true *argentatus*. WINGS: the primaries are regularly rounded at the tips, broader in web and deeper in color than in first year winter birds, but like them have dark tips except for a little grayish white on a few of the inner members of the series. They sometimes pale a little on their inner webs from the outer to the inner quills, some of the latter showing, in some cases, indications of the future tongues or "wedges" of the adult. Rarely there are slight traces of a white mirror on the outer (tenth) primary. The secondaries and their coverts are more solidly drab and more obscurely and finely mottled than the juvenal, the edgings whiter, less conspicuous and fusing, so that the coverts form a definite wing-band less mottled and edged than in the first winter. The other wing-coverts are less obviously edged and more fused and freckled rather than mottled. The primary coverts and the alula are clove-brown with slightly paler tips; the edge of the wing and the lining like the juvenal, but usually with an infusion of gray or white and less mottled. TAIL: the rectrices are squarish at their tips instead of rounded like the juvenal, darker in color, and basally and on the outer web of the outer pair whiter and freckled with dull black instead of being boldly barred. Tails often appear to be darker than in the first winter because they are so thickly and heavily freckled. BILL (see Pl. XII, fig. 4) "at base pale olive-buff, drab or flesh, whitish at extreme tip, terminal third black, gape pinkish white or buff" (Bishop); in skin, the basal two-thirds and extreme tip are pale brownish or yellowish flesh or clay-colored with a dull blackish band at and beyond the angle and nostrils. The band has ill-defined fused edges unlike the clear-cut black band of *californicus*, *delawarensis* and *canus*. LEGS AND FEET (see Pl. XII, fig. 4) "pale pinkish buff or pinkish white" (B.); in skins, yellowish brown of many shades, depending on age and on individual conditions. IRIS (see Pl. XII, fig. 4) "pale straw, buff, or brown, eyelids fuscous" (B.).

Variation at this stage is along several lines. The shape of the primaries and rectrices is very constant, although a very few birds tend to revert to the juvenal type, not only in shape of the feathers but in the pattern of the tail and body plumage. Average characters separating second winter plumages from first winter are (1) shape of the feathers of wings and tail; (2) freckling of the tail; (3) freckling of the back and wings; (4) gray feathers on the back; (5) drab wing-band; (6) paler tone of whole plumage; (7) whiter head and underparts. These characters

vary more or less independently, but, combined, generally suffice to distinguish the age of a bird. It seems probable that a larger proportion of birds fail to advance in plumage at the first postnuptial moult than at the second. The reversion of an unknown proportion of the second winter birds to the first year plumage or a type resembling it partly accounts for the large number of "young birds" that one sees on the wing or in every collection of skins. The variation is considerable, running from birds that are as brown as first winter specimens to those having on the back a considerable patch of gray, which extends irregularly to the scapulars, tertials, and sometimes even to some of the lesser wing coverts. European *argentatus* averages paler with much more white in the tail, which has larger areas of white and fewer spots. Arctic *thayeri* shows more extended tongues on the primaries and *vegæ* is only separable if some of the darker gray feathers of the back appear.

Second Nuptial Plumage

REFERENCE SPECIMENS.—J. D., No. 43898; ♂; March 3, 1916; Nassau County, Florida. J. D., No. 45762; ♀; March 16, 1902; Long Island, New York.

Acquired by a partial prenuptial moult in March, April, and May.

BACK: the amount of winter gray is increased, there are fewer brown or partially brown feathers; sometimes the whole back is gray. HEAD AND NECK largely white, but with conspicuous streakings and cloudings. UNDERPARTS largely white, but usually many of the old feathers forming the brown clouding of the mid-abdomen are retained, surrounded by whiter areas; throat and sides of breast usually streaked or clouded. WINGS AND TAIL and sometimes a considerable sprinkling of the body feathers of the winter are retained, all becoming much faded and worn. BILL, LEGS, FEET, AND IRIS change very little from the winter although the bill becomes more yellowish basally.

It is not at all probable that birds breed in this largely immature plumage, for such birds are rarely seen in breeding colonies.

Third Winter or Non-nuptial Plumage

Figures 97 to 100

REFERENCE SPECIMENS.—J. D., No. 4737; ♂; December 1, 1897; Long Island, New York. J. D., No. 49090; ♀; September 23, 1909; England; primaries not grown.

Acquired by a complete postnuptial moult in August and September.

MANTLE (including the entire outer surface of the wings except the primaries) pale to dark neutral gray, usually less silvery than in the adult and usually with some partly brown or brown-sprinkled feathers, rather inconspicuous among the secondaries tertials, and coverts. HEAD AND NECK white, the head duskily and thickly streaked, the neck clouded, almost solidly posteriorly, with pale clove-brown; dusky eye-crescent inconspicuous; eye-ring, posteriorly white. UNDERPARTS white, somewhat

duskily streaked and clouded on the throat and breast and often faintly clouded elsewhere, the under tail-coverts sometimes slightly barred. WINGS: the primaries are black, usually with (sometimes without) white apices which broaden progressively inwards from the tenth to the first. The outer (tenth) usually has a subapical white roundish spot or mirror of variable size, averaging perhaps twenty-five millimeters in diameter. It is usually somewhat blurred and confined to the inner web, but may extend so as to include the outer, the shaft dividing the mirror being black on upper surface and white below. In backward birds the mirror is deficient, blurred or even absent, and the same is true of the apical spots. The inner webs of most of the primaries usually show distinct gray tongues, the gray extending to the outer web also at about the seventh to fifth while the black retreats until it becomes only a sub-terminal band at about the sixth or fifth the next partly banded or else gray, and the third, second and first fading into the broad white tips. The variation is considerable, and backward birds may lack (or have smaller) apical spots or show less extensive gray tongues. The secondaries and tertials are largely gray with broad white tips, usually showing brown spots or specklings on at least some of them. The primary coverts and the alula are brown, partly gray somewhat mottled and with gray tips and edges. The edge of the wing and the lining are chiefly white with occasional flecks of brown. TAIL largely white, more or less smudged and a little freckled with dull black, chiefly on the outer webs of the median rectrices, diminishing towards their bases and towards the outer pair. The markings are asymmetrical on the two sides of the tail. The variation is considerable, from smudged to clouded, freckled, "fogged," and nearly white, probably all white in a few birds, especially European *argentatus*. BILL (*smithsonianus*) "yellowish olive-buff, or dull sulphur-yellow with slate-black or clove-brown bar or spots beyond nostrils; gape pinkish buff" (Bishop); in skin, the colors are little different. The variation is from a bill much like the second winter, though bills with clouded or dusky spots at angle or extending to the maxilla to a few with very yellow color and indications of a poorly developed red spot. LEGS AND FEET "pale ecru-drab, pinkish buff or pinkish white" (B.); in skin, like second year. IRIS "straw-yellow or buff, eyelids sepia or drab" (B.).

The average third-year bird may be known chiefly by the spotting of the tail, a few dusky feathers in the wings and dark markings at the angle of the bill. The races *argentatus* and *thayeri* differ from the others chiefly in smaller size, *thayeri* often with paler primaries, and *vegæ* may be recognized by the dark shade of the mantle.

It is difficult to say which are the average birds for, while an individual at this stage may acquire the adult type, either of primaries, of tail, of mantle, or of bill, probably few reach maturity in all of these particulars. The very backward birds are scarcely to be distinguished from advanced second winter birds, while the most advanced birds are practically adult or scarcely to be distinguished from fourth winter examples. The great majority, however, run true to type and progress from one plumage to the next along definite paths. Backward third year birds are sometimes difficult to separate from second year, because primaries and rectrices are of the same shape and the characters of the

two years are much mixed. It should be taken into account that wings and tails, having but one moult each year, advance to maturity more slowly than the body plumage, most of which undergoes two moults. The band or duskiness of the bill also is slow in dissipating.

Third Nuptial Plumage

REFERENCE SPECIMENS.—J. D., No. 20217; ♀; May 5, 1907; Long Island, New York. J. D., No. 49085; ♂; May, 1893; Ireland. A. M. N. H., No. 119098; ♂; June 12, 1911; Coronation Gulf, Mackenzie, Canada.

Acquired by a partial prenuptial moult in March, April, and May, birds at its conclusion usually resembling adults very closely.

MANTLE pale neutral gray like the winter. HEAD AND NECK pure white, streaked very slightly or not at all. UNDERPARTS white. WINGS AND TAIL of the third winter retained. BILL acquires some yellow color and occasionally more or less of the red spot of the adult, and the dusky band tends to disappear, there being considerable variation in color and in extent of the dusky areas. LEGS, FEET, AND IRIS, little different from winter but brighter and practically the same as in the adult.

Many specimens so closely resemble adults that it is possible that they breed in this plumage, although it is more likely that the breeding specimens showing immaturity here and there are backward fourth year birds.

Fourth Winter or Non-nuptial Plumage (Adult)

Figures 101 to 108

REFERENCE SPECIMENS.—J. D., No. 2077; ♀; January 18, 1889; near New York City. Also many others.

Acquired by a complete postnuptial moult at its peak in August and September, when the average bird reaches the mature plumage.

MANTLE pale neutral gray or darker (the "silvery" or "silvered" gray of the adult). HEAD AND NECK snowy white, the crown narrowly, sides of head and nape rather broadly marked with dusky streaks central and terminal on the feathers; eye-crescent dusky, not prominent. WINGS: primaries black, broadly white-tipped, a mirror on the outer (tenth) and in about fifty per cent of specimens also on the next (ninth); secondaries white-tipped forming a broad wing-band; axillars, lining and edge of wing pure white. TAIL snowy white. BILL (*smithsonianus*) "cadmium, Naples, lemon, cream and other yellows, spot flame-scarlet or orange-vermilion; gape yellow or cream" (Bishop); in skin, duller than in life, the red spot fading out in the course of years, the yellow color fading slightly. LEGS AND FEET "pale pinkish cinnamon, flesh-color or vinaceous buff" (B.); in skin, various yellowish flesh-browns. IRIS "maize, Naples, straw or pale orange-yellow; eyelids ochre, cream-buff or pale orange" (B.), "bright red" (*ex label*.)

It is doubtful if age can be determined beyond this point. The largest feathers and those situated where the circulation is slackest seem to be the slowest in developing adult characters, but individual

birds go contrary to rule in some cases. It is impossible from a study of skins to be always sure that the birds in hand are quite normal, but with large series available from different localities the normal may be better approximated. The error of supposing that it requires four or five years to reach the adult plumage has arisen from supposing that all birds move along at the same pace. The advance at each successive moult is really in geometrical ratio, a larger percentage approaching maturity, for instance, at the second postnuptial than at the first, and a still larger percentage at the third than at the second. It is the exceptional birds that are misleading. At all events, some Herring Gulls apparently adult in every respect may have one mirror only or two and while it seems probable that those with one mirror will acquire two a year later at the next postnuptial moult, there is no proof that the birds with one mirror ever get two. Birds in captivity may throw light on this point but they will require the closest scrutiny. I am informed by Dr. L. B. Bishop that specimens from the Pacific Coast never have but one mirror, and I have several specimens that support this contention. It is possible, however, that these birds are somewhat backward, or they may represent a constant variation. Those with one mirror have more or less broad shaft streaks on the primary coverts; those with two usually have the coverts pure gray like the mantle; but, with many exceptions to both extremes, it may only be surmised that the birds with dark coverts are a year younger. It is also quite probable that these may be merely individual variations and not due wholly to age; some specimens with pure gray coverts show immaturity elsewhere and others with dusky streaks are in every other respect fully adult.

The mirror on the outer (tenth) primary is regularly larger than that on the next. It is usually separated from the apical spot by a black band, but, rarely in *smithsonianus* and *vegæ*, and frequently in *thayeri* and *argentatus*, the mirror and the spot join, forming a white tip for fifty or sixty millimeters. The tongues are usually gray like the mantle, infrequently white in any of the races, and often whitening decidedly just as they touch the black subterminal areas of the eighth, seventh, and sixth primaries. They reach the least distance from the base of the primaries on the inner web of the outer; much more, as a rule, on the next; and reduce the black area on the others until it becomes a subterminal band usually on the fifth, with the fourth either all gray, white-tipped or with an imperfect and more or less obscure band. They do not quite reach the mirrors in average *argentatus*, *smithsonianus*, and *vegæ*, but merge with them in the more highly plumaged specimens of *thayeri*

and occasionally in those of the other races. They extend across to the outer web of the eighth primary just beyond the tips of the primary coverts in average specimens, and sometimes reach the web of the ninth, but never the outer web of the first, which is always black. The characteristic marking of *thayeri* is a tongue of white on the ninth that curls outward into a rudimentary or partial mirror, the outer (tenth) white-tipped like true *argentatus* for some fifty millimeters, the white often joining the tongue that takes up much of the inner web.

Fourth Nuptial Plumage (Adult)

REFERENCE SPECIMENS.—J. D., No. 15321; ♂; June 3, 1902; Gotland, Sweden. J. D., No. 29833; ♀; July 26, 1910; Mami, eastern Siberia. J. D., No. 12332; ♂; April 14, 1899; Beaver Dam, Wisconsin. M. C. Z., No. 40336; ♂; June 10, 1901; Ellesmere Land, Arctic Canada.

Acquired by a partial prenuptial moult, not including wings or tail, in March, April, and May, and differs from the fourth winter only in the unstreaked head, and in brighter colored bill, redder eyelids and gape.

Witherby (1923) describes adults as having the eyelids (orbital ring) orange-yellow, and the iris very pale lemon. If yellow eyelids are characteristic of all adults of European *argentatus*, then they differ in this respect from American *smithsonianus*, which most frequently has vermillion eyelids in summer, becoming duller or yellow in winter. I have myself examined fresh birds at both seasons, but there are always individual exceptions. In the east I have seldom seen a breeding bird with decidedly yellow eyelids.

The plumages of the Herring Gull have been described at considerable length and with some necessary repetition but it is because it is such a typical gull and, besides, it has been possible to study very large and complete series of specimens illustrating all the stages through which the species passes until it becomes adult.

Early writers mixed the Herring Gull with the Lesser Black-backed and other gulls and few of the early descriptions are diagnostic. Linnaeus neither at 1758 nor at 1766 distinguished such a species. Pontoppidan at 1763 first used the name *argentatus* and his description is perhaps as good as can be expected for his time. The Danish reads "Liig Perlmaagen (*L. glaucus*) men har mod Ende af de yderste Vingefiøere en sort Pløet" [Translation: Like Pearly Gull (*L. glaucus*) but has towards end of the outermost wing-feather a black spot, also on the underbill a red spot]. The "*L. glaucus*" is *canus*, for he refers to Brisson (1760) p. 182, Pl. XVI, f. 2, where *canus* is described under the name "La grande Mouette cendrée (*Gavia cinerea major*).” In passing it may be noted that Mathews

(1923) recently proposed adopting Pontoppidan's "*varius*" for the Herring Gull on the ground of anteriority. Pontoppidan, however, refers "*varius*" to Brisson's "Le Goiland varié ou le Grisard," p. 167, Pl. XV, which bird is certainly not a Herring Gull (*argentatus*) but doubtless the young of the Great Black-backed (*marinus*). The name *argentatus* will, therefore, stand if Pontoppidan is accepted as a binominal author (about which there is some doubt), but, if he is not, then the next available name seems to be *maximus* of Hermann, who gives an excellent description and, oddly enough, it is the only description of a gull in his 'Tabula.'

SUMMARY

Larus argentatus is a typical gull of the subgenus *Larus* characterized by size, by a larine bill with a red spot at the angle, by a silvery gray mantle and by primaries with white mirrors and gray tongues. It is a species that encircles the Northern Hemisphere, breeding chiefly between the parallels of 50° to 75°, and a bird familiar to the people of many lands. Four geographical races are here recognized, viz., (1) *argentatus*, (2) *smithsonianus*, (3) *vegæ*, and (4) *thayeri*.

(1) *argentatus* (Fig. 104)

Small size at all ages and paleness in the young bird mark this race; the first year tail, too, as a rule has much larger white areas than any of the other races and has a greater tendency to spotting rather than to barring, some birds in this respect resembling both *Larus fuscus* and *Larus cachinnans* very closely. Adults most frequently have the whole tip of the outer primary white, less often barred than in *smithsonianus* and *vegæ*, and without the extensive white pattern found on the primaries of *thayeri*. British breeding birds seem to average a trifle smaller than Scandinavian, but color differences are not obvious and it seems unlikely that two European races can be recognized.

(2) *smithsonianus* (Fig. 103)

There is little question that American birds are separable from European, as already shown, but the name applicable to them is a matter of some doubt. Brehm in 1822 ('Beitr. Vogelk.,' III, p. 791) described three species of Herring Gulls, one of them, "*argentatoides*," based on several specimens from northeast Germany and a single bird from the western coast of North America. This mixing of two localities renders his "*argentatoides*" unavailable and it becomes a synonym of *argentatus*; and the names, "*argenteus*," "*argentaceus*," and "*major*" have been applied only to European birds. In 1831 Brehm, in reviewing the gulls, used the name "*americanus*" for "die nordamerikanische

Silbermove," his diagnosis reading (translated): "Differs from No. 4 (i.e., "*argentatoides*" = *argentatus*) in somewhat smaller bill and by the crown raised farther back." Brehm may possibly have had the above-mentioned "west-coast" specimen in hand, possibly one of the small-billed *thayeri*, but his description cannot apply to east-coast birds, which are larger than his "*argentatoides*." It is a great pity to establish a new name based on a doubtful description, which Brehm's certainly is, and under the circumstances as there is no evident reason for accepting "*americanus*" it, therefore, seems necessary to adopt the next available name, "*smithsonianus*" of Coues (1862), who gives a correct diagnosis and an able discussion of the characters.

(3) *vegæ* (Fig. 106)

It is probable that Bruch (1853) first recognized this race under the name *borealis*, his brief diagnosis being as follows (translation): "Northern Asia, considerably larger than *argentatus*; but in other respects similar to it." It is a name, however, about which there is grave doubt, if one wishes to be conservative, because the description is inadequate and might apply to *L. fuscus taimyrensis* or possibly *L. cachinnans*. Therefore it is wiser to adopt *vegæ*, which seems to be the next available name and one that has been generally used. This race is not separable from *argentatus* or *smithsonianus*, except perhaps by size, in any of the first year plumages, but the darker mantle usually appears more or less in the second year. It is the largest of the Herring Gulls and it has the darkest mantle, the adult showing a shade of neutral gray very close to that of *Larus occidentalis occidentalis*, for which some of the earlier writers mistook it. The average mantle is much darker than the paler, more silvery specimens of *argentatus*, *smithsonianus* or *thayeri*, but pale birds shade into the darker birds of these races. The mantle is not dark enough ordinarily to be mistaken for *Larus fuscus taimyrensis*, nor has it this bird's wing-pattern or the yellow feet and in winter the ranges of the two species do not seem to overlap so that even juvenal birds cannot be confused. There is danger, however, of confusing it with *Larus cachinnans*, which in my opinion is a separate species in spite of the fact that puzzling winter specimens come from the coast of Japan and China. Adult *vegæ* may be distinguished by flesh-colored legs and feet at all seasons with a streaked head in winter and *cachinnans* by yellow legs and feet and by a white head at all seasons. The juvenal birds of *vegæ* are darker than *cachinnans*, especially the tails, but the legs and feet are much the same in both species and, of course, in skins the colors of both adults and young become the same dull brown or yellow. Any record of color on labels is valuable if correct.

(4) *thayeri* (Fig 108, type)

The earliest description of this bird is probably that of Richardson in 1831 [= 1832] based on a specimen taken on the Melville Peninsula of Arctic America, but his name "*argentatoides*" is not available because it is preoccupied by Bruch's "*argentatoides*" (= *argentatus*). Arctic North American records that have been referred to *argentatus* probably belong to this race.

The recognition of *thayeri* brings up a very interesting question of origin and relationship for, while when typical it has all the characters of a Herring Gull, there is often a tendency to slaty or grayish rather than black primaries at all ages and a maximum of white rather than gray in the wing-pattern of the adult. It is small, especially the bill, and seems to be a rather unstable form, as the variation both in tone and pattern is considerably more than in the other races. It is perhaps more closely related in size and wing-pattern to true *argentatus* than to the American form *smithsonianus*. Breeding specimens of *thayeri* usually have black wings, the white tongue on the first primary often joining a long white tip and the tongue on the second curling outward into a partial or nearly complete mirror. In the other races of the Herring Gull the gray tongues rarely reach either the mirrors or the wholly white tips (if present). A pattern just like *thayeri* occurs regularly in *glaucescens*, occasionally in *schistisagus*, and somewhat less distinctly in *marinus*. The birds of which I am speaking are fully adult for in juvenal and first year, as well as second and probably third year plumages *thayeri* is not much different from the other Herring Gulls (unless grayish, slaty primaries are present). I believe that birds with the grayer primaries and tails are not thoroughbreds.

Surprising as it may seem, a large series shows that with increase of the white element whatever it is, as indicated by paler and paler primaries and larger areas of white, there is complete intergradation, first between *Larus argentatus thayeri* and the bird now known as "*Larus kumlieni*," and then between "*Larus kumlieni*" and *Larus leucopterus*. There is no escaping from this fact, explain it as we may. As no new character appears we are obliged to discard mutation as an explanation and we are, therefore, forced to the conclusion that "*kumlieni*" is some sort of a hybrid, unless we are prepared to consider *Larus argentatus* and *Larus leucopterus* a single species because completely connected by intergrades in size, in color and in pattern. Nobody is likely to accept this latter conclusion so foreign to generally accepted ideas of species and therefore hybridity is the most plausible explanation of "*kumlieni*." No two speci-

mens are quite alike, the variation being confined of necessity, in adults, to wing-pattern because elsewhere they are alike in color. The pale primary tips may be partially banded or smudged with gray or brown, and sometimes are wholly white with a mere dash of dark color on the outer webs of one or two of the distal quills. In juvenal plumage supposed "*kumlieni*" are pale in varying degree in wings, tail, and body-plumage, but they mostly show the pattern of *argentatus*. In adults, it should be noted, the dark subapical bands of practically white primaries persist just where they remain darkest in other species that pass from a dark juvenal stage to a much whiter adult (see Figs. 213, 214, 221 to 226).

In distribution the black-winged *argentatus* and the nearly white *leucopterus* meet along a line extending approximately from Hudson Strait to Victoria Land and the few summer specimens extant of "*kumlieni*" have been taken at Cumberland Sound, Baffinland, which is not far from the eastern end of this line. It is plausible, therefore, to suppose that "*kumlieni*" represents a mixture of the two stocks, the *argentatus* and the *leucopterus*, and this perhaps accounts for the occurrence of the large-billed "*kumlieni*" on the Atlantic Coast in winter migrating from the eastern end of the intergradation line, and of the paler specimens of the small-billed *thayeri* on the Pacific Coast in winter from the western end. Besides those from the Pacific Coast, I have examined only two *thayeri* taken after the breeding season, one from Tadousac, Quebec (1917, Auk, XXXIV, p. 414), and one from Chicago, Illinois ('Brit. Mus. Cat.,' XXXV, p. 264), the latter with "lead-colored" primaries.

The question of hybridization among gulls has been discussed by Lönnberg (1919,) and in the present connection it is of interest to learn that one bird of a cross between a male *fuscus* and a female *leucopterus* lived to reach a third year plumage in a zoölogical garden. The mantle of this hybrid became nearly as pale as *leucopterus*, but the primaries remained largely black. This seems to indicate that "*kumlieni*" is not a first generation hybrid, whatever else it may be. Nor does *glaucescens*, as has been suggested, cut any figure in explaining the origin of "*kumlieni*," because the range of *glaucescens* does not touch that of *leucopterus*.

Summing up the available evidence based upon the examination of more than fifty specimens of *thayeri* and "*kumlieni*," it appears (1) that no two adults of "*kumlieni*" are alike in primary pattern, (2) that the breeding range of "*kumlieni*" lies between that of *thayeri* and *leucopterus*, (3) that increase of white produces similar patterns in other species as they lose the dark colors of immature plumages and (4) that Pacific specimens are smaller than the Atlantic birds. It would seem, therefore,

that “*kumlieni*” is perhaps an incipient species with a mixture of characters, but at present it appears to be of hybrid origin, intergrading with *Larus argentatus thayeri*, a marked geographical race, to the west and with *Larus leucopterus* to the east.

Additional remarks will be found under *Larus leucopterus*, p. 254.

Larus californicus

California Gull

Plate XI; Figures 109 to 120

Larus californicus LAWRENCE, 1854, Ann. Lyc. Nat. Hist., N. Y., VI, p. 79 (San Joaquin River, near Stockton, California).

Larus delawarensis ALLEN, J. A., 1872, Bull. Mus. Comp. Zoöl., III, p. 173.

DISTRIBUTION

Breeding range includes small islands in many of the inland lakes of the western United States and Canada from Great Salt Lake, Utah, and Mono Lake, California, north to Great Slave Lake (about latitude 65° N.). In winter south to the coasts of British Columbia and California, and less frequently reaching Oaxaca, Mexico and the coast of Texas.

MEASUREMENTS

	MALES (13)	FEMALES (10)
Wing	383–415 (398.8)	368–395 (384.2)
Tail	150–162 (156.1)	150–155 (152.2)
Tarsus	57– 63 (60.6)	53– 60 (56.7)
Toe without claw	46– 52 (49.0)	43– 49 (45.7)
Culmen	45– 56 (50.0)	42– 49 (46.1)
Bill at base	15– 18 (16.3)	13– 16 (14.7)
Bill at angle	15– 20 (16.9)	14– 17 (15.4)

MOULTS AND PLUMAGES

Natal Down

REFERENCE SPECIMENS.—J. D., No. 16759; ♀; July 21, 1906; Maple Creek, Saskatchewan, Canada. L. B. B., No. 13130; ♂; June 29, 1905; Stump Lake, North Dakota.

BACK, WINGS, AND SIDES dingy white coarsely and indistinctly spotted or clouded with clove-brown. HEAD decidedly white with comparatively few and often small clove-brown spots which are arranged in irregular chains. UNDERPARTS grayish white and paler on the breast, unmarked except for a few deep brown spots on sides of chin and jugulum. BILL “black, with dull white extreme tip” (*ex* label); in skin dull black with extreme tip and egg-tooth yellower. LEGS AND FEET “dark brown” (*ex* label); in skins browner and duskier. IRIS “brown” (*ex* label).

Usually separable from *argentatus* and *delawarensis* by the whiter tone and whiter head with fewer, clearer, and less blurred spots, which are laterally lacking (except posteriorly).

Juvenal Plumage

Figures 109 and 110

REFERENCE SPECIMENS.—J. D., No. 16751; ♂; July 21, 1906; Saskatchewan, Canada.

BACK AND MANTLE-AREA dark clove-brown, broadly edged with pale buff, which soon fades nearly to white; rump and upper tail-coverts whiter and more conspicuously barred. HEAD dark clove-brown with obscure grayish white blurred streaks, slightly grayer on forehead and sides of head (sometimes buffy about eye and throat), the hind neck almost solidly dusky brown with practically no edgings, the feathers dull white basally and terminally; eye-crescent and eye-ring black, the latter grayer posteriorly. UNDERPARTS uniformly dark clove-brown with obscure barring and edgings; the chin and adjacent throat whiter with flecks on the former and dark streaks on the latter. WINGS: primaries, dull black, the inner with tips and inner webs faintly brownish gray; secondaries, paler with grayish "watered" tips and some mottling on the inner feathers; greater coverts and tertials rather paler and mottled on the outer edges; the lesser and median coverts like the back; edge of wing and lining deep clove with slightly paler edgings. TAIL deep clove-brown or dull black with irregular coarse white barring just like *argentatus*, variable in pattern and extent. BILL (see Pl. XI, fig. 3) in very young birds "mostly black," when older, "purplish flesh or drab basally"; gape "pinkish flesh" (*ex labels*); in skin basally brownish or yellowish flesh-color abruptly tipped with black beyond the nostril as if dipped just so far into ink (unlike the blurred edges in *argentatus*). LEGS AND FEET (see Pl. XI, fig. 3) "drab or pinkish buff" (*ex labels*); in skin, dull flesh-brown. IRIS (see Pl. XI, fig. 3) "deep brown; eyelids black" (*ex labels*).

The variation is much like that in *argentatus*, which it resembles except for size, darker tone, less "watered" feathers (especially on the hind neck), paler rump and sharply black-tipped bill. The bill is like *delawarensis*, but the tail-pattern is quite different from this species, also the relative size. The coarser, more extensive white spotting of the tail-pattern and abruptly black-tipped bill separate it from *occidentalis*.

First Winter or Non-nuptial Plumage

REFERENCE SPECIMEN.—J. D., No. 32977; ♂; November 12, 1912; Pacific Grove, California.

Acquired by a partial postjuvenal moult in September and October.

BACK paler and grayer than the juvenal, and with less mottling, and the barring of a paler brown, more fused and diluted. HEAD dark and heavily streaked, a trifle paler than the juvenal. UNDERPARTS paler than the juvenal on chin, throat and breast. Wear brings into prominence the barrings and mottlings through loss of feather edgings, producing a spottiness lacking in *argentatus*. WINGS AND TAIL of juvenal plumage retained. BILL AND OTHER SOFT PARTS much like the juvenal.

First Nuptial Plumage

REFERENCE SPECIMEN.—L. B. B., No. 16001; ♂; July 18, 1906; Big Stick Lake, Saskatchewan.

Acquired by a partial prenuptial moult in March and April. Wings and tail of the juvenal plumage still retained.

BACK like the first winter, but rather paler and with diminished central areas on the new brown feathers, some grayish. HEAD much like the first winter but rather paler. UNDERPARTS rather paler than the first winter, the chin and throat largely white. BILL AND OTHER SOFT PARTS much like the juvenal.

Second Winter or Non-nuptial Plumage

Figures 111 and 112

REFERENCE SPECIMEN.—J. D., No. 32965; ♀; November 20, 1912; Pacific Grove, California.

Acquired by a complete postnuptial moult in August and September.

BACK AND MANTLE-AREA largely gray, but many feathers browner than in the adult, and usually some are partly or wholly sprinkled with brown. HEAD AND NECK very much whiter than the first winter, forehead white, crown more narrowly streaked, the streaks becoming broad and heavy, almost mottled and clouded on the hind-neck. WINGS: primaries dull black, rounded tips, the inner four or five tips paler, usually with an imperfect mirror on inner web of outer (tenth) which varies in extent and may be absent; dull white tongues. When the mirror is absent, the inner primaries show very little advance towards maturity the terminal portions being nearly alike and dark until the gray second and first are reached. The tongues reach beyond the primary coverts on the eighth or seventh and others, the fourth usually showing a subterminal black band, the third mostly gray with (usually) a subterminal spot or smudge, the second and first gray; primary coverts like the primaries; alula grayer; greater coverts less mottled and more freckled than in the first winter; other coverts similar or with a little gray on the inner edge; under wing-coverts and edge of wing white with scattered brown edgings, secondaries brown with grayish white edgings somewhat freckled; tertials mostly gray, or gray and brown with freckling. UNDERPARTS largely white, a little streaking on sides of and across throat and breast, the abdomen obscurely spotted or clouded. TAIL: rectrices squarer at tips than the juvenal, dull black, freckled basally, and whiter than in *argentatus*, some resembling in smudged or "fogged" appearance a third year *argentatus*. Some tails are barred like first winter, others more often with much white especially on the outer web of the outer rectrix. BILL "pale dull glaucous blue, or mineral gray, pinkish white basally and tipped with black, the extreme tip white, sometimes a spot of orange buff at angle; gape pale flesh-color, sometimes orange-tinged" (Bishop); in skin, yellowish basally and at tip with a sharply defined black band crossing both mandibles at the angle. LEGS AND FEET "bluish or greenish gray" (B.); in skin, pale yellowish flesh. IRIS "auburn or Dresden-brown; eyelids black" (B.).

Second Nuptial Plumage

REFERENCE SPECIMEN.—L. B. B., No. 29466; ♂?; May 18, 1917; Los Angeles County, California.

Acquired by a partial prenuptial moult in March, April, and May.

MANTLE: head, throat and breast new, much like the second winter, but head whiter, less streaked. WINGS AND TAIL of winter retained. BILL with more color the black diminished, the gape usually brighter orange.

Third Winter or Non-nuptial Plumage

Figures 113 to 116

REFERENCE SPECIMEN.—J. D., No. 43117; ♀; July 31, 1915; Netarts, Oregon; largely in third winter dress, but still retaining two old primaries, the outer pair of freckled second winter rectrices and a few other second year brown feathers not yet moulted. A. M. N. H., No. 47199; ♀; November 3, 1889; Cape Disappointment, Washington; in fresh winter plumage.

Acquired by a complete postnuptial moult in July and August.

MANTLE clear neutral gray. HEAD AND NECK white, especially forehead, dusky streaked on crown and more broadly on hind neck. UNDERPARTS white, streaked and spotted rather coarsely on throat and sides of breast. WINGS: primaries black with broad apical spots and large mirrors on the two outer, clear gray tongues on all; the gray on the tenth (outer) does not usually reach the end of the primary coverts, reaches farther on the ninth to seventh, includes both webs of the sixth and fifth, and leaves only a subterminal band of black on the seventh to fifth (or sixth to fourth), the others clear gray fusing into broad white tips; secondaries and tertials gray with broad white tips; primary coverts and alula largely gray or with brown smudges and frecklings; wing-coverts clear gray or with faint brown edgings or frecklings, wing-lining and edge white with occasional brown flecks or edgings. TAIL largely white, with a few irregular subterminal smudges, chiefly on inner webs of several central rectrices. BILL "pale glaucous or yellowish green, the black band diminished or broken, with orange or red spot at angle; gape orange or maize-yellow" (Bishop); in skin, resembles adult but black band more conspicuous, often split by red spot or the red on both sides of band. LEGS AND FEET "pale glaucous green or mineral gray often yellowish" (B.). IRIS "auburn; eyelids Brussel's brown" (B.).

An extremely backward bird (A. M. N. H., No. 26237; ♂; September 30, 1876; Lake Tahoe, California) has one dingy mirror and short wedges, but the primaries have white tips, a band on the fifth and the fourth gray; the tail is heavily blackened and freckled, even the outer pair of rectrices; primary coverts and alula and secondaries smudged, the greater coverts brownish tinged; elsewhere, including the bill, adult.

Third Nuptial Plumage

REFERENCE SPECIMENS.—A. M. N. H., No. 140197; ♂; April 6, 1910; Ensenada, Lower California. L. B. B., No. 33109; ♂; May 2, 1922; Hyperion, California.

Acquired by a partial prenuptial moult in March and April.

A pure white head, throat and breast and gray back is assumed, most of the rest of the winter plumage being retained.

BILL yellower than in winter, the gape a deeper orange. LEGS AND FEET bluer than in winter. IRIS browner; eyelids redder (*ex* labels).

Fourth Winter or Non-nuptial Plumage (Adult)

Figures 117 to 120

REFERENCE SPECIMEN.—J. D., No. 50351; ♀; November 6, 1909; Okanagan, British Columbia.

Acquired by a complete postnuptial moult in August, September, and October.

MANTLE neutral gray. HEAD AND NECK white with dusky streaks. UNDERPARTS pure white. WINGS: primaries black, the outer with a white tip for about fifty millimeters or crossed with a narrow band forming a mirror, the next with a mirror usually on both webs but varying in extent, sometimes absent; all with tongues passing to outer web except on ninth and tenth, and with broad white apical spots; the black reduced to a broad subterminal band on the sixth (usually) and a narrow band on the fifth; in the others the basal gray fades into white tips; primary coverts gray like the mantle; secondaries and tertials gray like the mantle, broadly white-tipped, rest of wings like mantle, the scapulars white-tipped. TAIL white. BILL (see Pl. XI, fig. 4) "wax to deep chrome and orange sometimes (greenish) yellow with red spot and crossed by partial black band; gape orange-chrome to flame-scarlet" (Bishop). LEGS AND FEET "olive-ochre" (*ex label*); "grayish or yellowish olive-ochre, cream, massicot yellow, olive-buff, bluish at joints" (B.). IRIS "yellow, sometimes brown; eyelids scarlet" (B.).

Mr. Allan Brooks in a letter says "feet may range from gray-green to bright yellow." In *delawarensis* the variation is similar and is apparently neither seasonal nor geographical. Varying mixtures of bluish and yellowish pigments may account for this range of color, blue-gray at one extreme and yellow at the other, with greenish yellows in between.

Adult plumage is assumed at the beginning of the fourth year, the species having a four-year cycle. Birds in completely adult dress usually have two mirrors, the outer primary often with a wholly white tip or a large mirror crossed by a narrow black line. There is much variation, some few birds having a mirror only on the outer. The type of the species (A. M. N. H., No. 46070; California), which I have examined, is such a bird and is doubtless a fall female. The outer primary is not fully grown and the head and neck are streaked. It is, unfortunately, not a typical specimen, as most adults have either two mirrors, or more often the outer primary has a long white tip. This specimen (Fig. 117) has but one mirror.

Fourth Nuptial Plumage (Adult)

REFERENCE SPECIMEN.—J. D., No. 16716; ♂; July 18, 1906; Maple Creek, Saskatchewan, Canada.

Acquired by a partial prenuptial moult in March and April. A white head and neck are assumed, the new feathers elsewhere like the old; wings and tail of the winter retained. Bill and other soft parts

brighter than in winter (see Pl. XIII, fig. 4), the bill usually with a partial band or dusky spot at the angle, seldom completely free of some trace of this character.

SUMMARY

An inland-breeding North American species, largely a bird of the plains bordering on the southern and western edge of the summer range of *Larus argentatus smithsonianus*, to which it is closely related. It is similar in bill and in pattern of wing and in tail, differing however in slight dusky markings (almost never lacking) beyond the gonys on the bill of adults and in the yellow-green color of the feet (this last diagnostic in fresh skins but lost in museum specimens). The partial band of the bill seems to indicate relationship to the gulls of the *Adelarus* group, but in other respects the species fits into *Larus*.

In the first year it closely resembles *smithsonianus*, from which, however, it is separable by the sharp demarkation of the black at the tip of the bill, and usually by smaller size when like sexes are compared. In later years and in adults the darker gray of the mantle separates it from all the Herring Gulls except *vegæ*, which is of the same shade but a larger bird with a mirror instead of a long white tip on the outer primary and flesh-colored feet. The dusky markings of the bill, yellow color of the feet, brown iris, and long white tip of the outer (tenth) primary (resembling European *argentatus*) establish its specific distinctness, for no other species has this combination of characters.

Larus cachinnans

Yellow-legged Gull

Figures 121 to 130

Larus cachinnans PALLAS, 1826, 'Zoog. Rosso-Asiat.,' II, p. 318. (Caspian Sea).

Larus leucophæus BRUCH, 1853, Journ. für Orn., p. 101.

Glaucus michahellesii BRUCH, 1853, Journ. für Orn., p. 101.

Larus epargyrus LICHTENSTEIN, 1854, 'Nom. Av.,' p. 99.

Larus heuglini BREE, 1876, 'Hist. Bds. Europe,' 2d Ed., V, p. 58.

Larus marinus FINSCH, 1877, Ibis, p. 53.

DISTRIBUTION

Breeding range is from the shores of the Adriatic Sea (Echinades Islands) eastward to Lake Baikal, Siberia, including the Black and Caspian Seas and some of the larger lakes of eastern Russia also from the Gulf of Finland to the White Sea. It is an inland species as compared with *argentatus* or *fuscus*. In winter it is found about the Mediterranean and Red Seas, the Persian Gulf, and the coasts of Arabia, Persia, Baluchistan,

India, China, and Japan; less frequently in the western Mediterranean and on the Atlantic coast of Spain.

MEASUREMENTS

	MALES (20)	FEMALES (16)
Wing	425-458 (443.3)	410-440 (424.1)
Tail	160-184 (173.8)	160-178 (167.4)
Tarsus	64- 76 (70.0)	60- 68 (65.0)
Toe without claw	52- 60 (56.4)	47- 57 (51.9)
Culmen	52- 64 (57.1)	50- 56 (52.9)
Bill at base	17-20.5 (18.7)	16- 19 (17.0)
Bill at angle	17-21 (19.2)	16- 19 (17.4)

MOULTS AND PLUMAGES

Natal Down

Not seen but, from published descriptions, if they really are of this species, differing little from *argentatus*.

Juvenal Plumage

Figures 121, 125, and 126

REFERENCE SPECIMENS.—Brit. M. (Saunders, No. 2335); June 2, 1873; Echinades Islands, Greece. Brit. M., 88.12.6.124; ♀; October 22, 1886; Fao, Persian Gulf. Brit. M., 91.5.20.50; ♀; November 15, 1867; Sutlej River, India.

BACK AND MANTLE-AREA pale clove-brown with broad buff edgings, "watered"; rump white, irregularly and partially barred. HEAD AND NECK similar in tone, whitish but thickly and narrowly streaked, more broadly on the neck. UNDERPARTS white, especially the chin, with brown streaking and spotting or clouding on the throat, becoming coarser on breast and sides. WINGS: primaries dull black, whitish on webs of inner quills which are faintly paler at tips; secondaries browner with inconspicuous white tips; tertials like back with broader white edgings; alula and primary coverts dull black; greater coverts darker; lesser, like the back, in some cases obscurely mottled; wing-lining and axillars whitish with brown edgings. TAIL brownish black with narrow buff or whitish edging (not over 5 mm.), basally largely white, more or less raggedly spotted with a few blotches on outer tending to barring on the inner rectrices. Outer pair usually white nearly to tip with a terminal dusky band (about 30 mm.), less apparent on the outer web and with a few irregular spots, the next pair with more spots and the others with broader bands (often 55 mm.) which break up into barrings and dusky sprinklings basally. BILL, in skin, black, paler brownish-flesh basally. LEGS AND FEET "pale fleshy brown" (*ex label*): "feet pinkish white" (*ex label*). IRIS brown, probably.

The extent of white in the tail and the spotting varies greatly, somewhat resembling the pattern of *Larus argentatus argentatus*, but with more spotting than barring and in this more resembling *Larus fuscus*. There is usually much more white throughout the plumage than in these species, especially in larger tongues of the primaries, in the tail and about the head.

First Winter or Non-nuptial Plumage

REFERENCE SPECIMEN.—Brit. Mus., 88.12.6.124; ♀; October 22, 1886; Fao, Persian Gulf.

Acquired by a partial postjuvenal moult in September, October, and November.

BACK paler brown than the juvenal, the brown fusing more evenly with narrower streaking. HEAD whiter than the juvenal with narrower streaking. UNDERPARTS mostly white with a few streakings on the throat and sides. The middle area of retained juvenal feathers fades to a pale brown. WINGS AND TAIL of juvenal plumage retained. BILL AND SOFT PARTS similar to the juvenal.

First Nuptial Plumage

REFERENCE SPECIMENS.—Brit. Mus., 1908.1.2.72; ♀; March 25, 1886; Shanghai, China. J. D., (unnumbered); March 1900; ♂; Shantung, China.

Acquired by a partial prenuptial moult in March and April. Wings and tail of juvenal plumage retained, much worn and faded.

BACK partly new gray sometimes but chiefly new brown mottled or grayish tinged. HEAD AND NECK white, the head narrowly and lightly, the neck more heavily streaked. UNDERPARTS anteriorly and laterally with new white feathers, the retained middle area of juvenal feathers much worn. BILL becomes rather paler at base and tip; other soft parts much like the juvenal.

Second Winter or Non-nuptial Plumage

Figure 122

REFERENCE SPECIMEN.—Brit. M., 88.12.6.123; October 22, 1886; Fao, Persian Gulf; and January and February specimens.

Acquired by a complete postnuptial moult in September and October.

BACK AND MANTLE-AREA largely gray mixed with dusky brown laterally and on the wings, the amount of gray very variable. HEAD white with narrow dusky streaks on the occiput, increasing and broader on the nape; eye-crescent black but not very marked, the hair-like feather tips separate and sweeping above and below eye. UNDERPARTS white with perhaps a few cloudings, the sides of the neck somewhat streaked. WINGS: primaries black, paler on inner webs and sometimes with traces of tongues (or "wedges") and faint apical spots or else brownish tipping; secondaries partly gray with dark centers and along shafts; tertials with more brown than on the back, in spots or cloudings varying in position and extent; greater coverts brownish gray or with brown peppering; lesser coverts with still more brown; wing-lining white, the feathers slightly edged with brown. TAIL largely white basally, with a vermiculated, "fogged" or peppered area in passing to a broad indefinite somewhat smudged black terminal band with very narrow pale buff tipping, the outer two pairs of rectrices with the most white. BILL, in skin, dusky, the base and extreme tip pale yellowish flesh. LEGS AND FEET, in skin, yellowish flesh-brown. IRIS probably brown.

Second Nuptial Plumage

No specimen examined.

Acquired doubtless by a partial prenuptial moult, when probably a white head, perhaps faintly streaked, is assumed with more gray on the back, the old second winter primaries and tail being retained; bill and other soft parts with more color.

Third Winter or Non-nuptial Plumage

Figures 123 and 124

REFERENCE SPECIMENS.—Brit. M., 91.5.20.31; ♀; January 8, 1872; Larkhana, India.

Acquired by a complete postnuptial moult in August, September, and October.

MANTLE light neutral gray, usually with a brownish tint. HEAD white, the occiput usually faintly lined, the neck quite broadly although sparsely streaked, but pure white next to the mantle. UNDERPARTS white. WINGS: primaries black, usually with small apical spots, the tenth (outer) and ninth usually with small (sometimes large) blurred mirrors (or with only one) perhaps 20 mm. on the outer and 7 mm. on the ninth and with white tongues grayer, on the inner quills, reaching on the outer to about 160 mm. from the tip, on the ninth to 120 mm., on the eighth to 100 mm., on the seventh to 57 mm., etc., the fourth with a subterminal band, the third (or fourth often) with a half band on outer web, the second and first gray with broad white tips; primary coverts brownish black, dull white-tipped; secondaries and tertials, gray with some dusky mottling and blotching broadly white-tipped and edged; greater and lesser coverts, with more gray or with a sprinkling of brown; lining and edge of wing mostly white. TAIL white, the rectrices blotched more or less on the inner webs and smudged on the outer; the outer pair mostly (sometimes wholly) white, and sometimes the whole tail white. BILL, in skin, yellowish flesh with blurred dusky band at angle and a tinge of red at site of red spot found in the adult. LEGS AND FEET, in skin, pale brownish flesh with yellow tinge. IRIS probably pale yellow.

Third Nuptial Plumage

REFERENCE SPECIMEN.—J. D., No. 23156; ♂; May 1908; Kalmuk Steppes, Russia.

Acquired by a partial prenuptial moult in March, April, and May.

The old third winter wings and tail retained. Much like the third winter except for new white head and fresh feathers elsewhere.

Fourth Winter or Non-nuptial Plumage (Adult)

Figures 127 to 130

REFERENCE SPECIMENS.—J. D., No. 14173; ♂; February 1904; Bona, Algeria. J. D., No. 14174; ♂; March 2, 1904; Danube delta, Rumania.

Acquired by a complete postnuptial moult in August, September, and October.

MANTLE light neutral gray. HEAD AND NECK white. UNDERPARTS white. WINGS with much white in the pattern; outer primaries black, the tenth with long white tip crossed by a narrow black bar, and a white tongue nearly reaching the white of the tip, the ninth with a white mirror and a grayish white tongue that crosses to outer web near tips of the primary coverts and becomes white at its extremity, the eighth similar but lacking the mirror, the seventh gray broadly banded terminally, the sixth and fifth more narrowly banded, inner four gray with broad white tips, secondaries gray with broad white tips forming a wing-bar; tertials gray white-tipped; primary coverts gray; edge of wing, adjacent coverts, lining and outer feathers of alula white, inner alula feathers gray. TAIL white. BILL, in skin, yellow with red spot. LEGS AND FEET, in skin, pale yellowish, flesh-brown. IRIS "pale yellow" (*ex label*).

This species has a four-year plumage-cycle.

Fourth Nuptial Plumage (Adult)

REFERENCE SPECIMEN.—J. D., No. 14171; ♂; April 10, 1902; Rumania.

Acquired by a partial prenuptial moult in March and April.

Not different from the winter plumage, of which the wings and tail are retained, but the fleshy eye-ring (eyelids) is a bright red instead of yellow (*ex labels*).

SUMMARY

The status of *Larus cachinnans* has long been open to doubt because it has some characters peculiar to the *Larus fuscus* group of gulls and some others to the *Larus argentatus* group. When adult it has the bright yellow legs and feet of the former combined with size, mantle, and wing-pattern much like the latter, a combination which has given rise to the vernacular name of "Yellow-footed Herring Gull." The facts on analysis do not seem to warrant this conclusion because primarily none of the Herring Gulls ever have yellow feet. Flesh-color is as specific with them as yellow is with the Lesser Black-backed group or red with other gulls; nor are intermediate colors found in any adults. The juvenal birds of both species, it is true, have flesh-colored legs and feet, but by the end of the first year yellow has begun to appear in *cachinnans*; never in *argentatus*. Museum specimens, however, soon lose the fresh colors and flesh, yellow, or any other color becomes indistinguishable sooner or later except by the legend, sometimes put on labels by the collector, mentioning color. Besides the yellow feet, *cachinnans* has a wing-pattern that is only approached by that of *thayeri*, the palest Herring Gull. But the tongues of the primaries are whiter and more extensive (gray only in the younger birds) and there is a white head in winter like *fuscus* quite unlike the streaked heads of the *argentatus* group. There are two large mirrors in typical specimens, the one on the tenth primary often merging

into a long white tip. In tongues and mirrors *cachinnans* is quite unlike the *fuscus* group which lacks tongues on the outer primaries and only rarely has a second mirror, but, on the other hand, the juvenal tail is more like *fuscus* than like *argentatus*.

The white element in *Larus cachinnans* showing in the pale mantle and white wing-pattern produces a juvenal plumage paler than any of the races of either *fuscus* or *argentatus* and a much whiter head and tail than either and it probably accounts for the pure white head of the winter plumage after the first year, while the other two species have more or less streaking. The primary pattern of the second year resembles *argentatus* of the third, probably because white was predominant during the first, and third year birds often seem to be quite adult although they have only one mirror and tongues that are usually short and gray. Another bit of evidence that seems to support the specific claims of *Larus cachinnans* is the fact that its voice is said to be unlike *argentatus* but somewhat resembles that of *Larus marinus*.

Summarizing the available evidence, it appears that *cachinnans* cannot be a Herring Gull because of the yellow legs and feet and white head in winter; nor can it be a Lesser Black-backed Gull because of the extensive white wing-pattern; therefore it may be considered a full species although somewhat intermediate in its characters between the two. The mantle is darker than the Herring, and paler than any Lesser Black-backed Gull. As the western limits of its range are approached, the white in the wing-pattern diminishes sometimes to gray; only one mirror is found; and some specimens approach *Larus fuscus atlantis*, although they usually have longer tongues on more of the primaries. Again, at the eastern limits there are specimens that can scarcely be distinguished from *Larus argentatus vegæ* although paler. Therefore it seems to me that, unless we are prepared to consider the Herring Gull (*argentatus*) and the Lesser Black-backed gull (*fuscus*) one and the same species because of *cachinnans* (a connecting link), we must consider *cachinnans* a full species combining the characters of both.

In this connection we should read what Hartert (1823) has to say, but for reasons already given I cannot agree with him that *cachinnans*, *atlantis*, and *michahellesii* are races of the Herring Gull, nor do I believe that *michahellesii* should be recognized at all. I think that, while the characters of the last proposed race are intermediate, the grayness of the tongues of the primaries is probably due, partly at least, to age. I have examined such birds in the British Museum collection, mostly winter specimens, but was not convinced that they were separable.

Larus fuscus

Figures 131 to 142

Larus fuscus fuscus—Scandinavian Lesser Black-backed Gull*Larus fuscus* LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., I, p. 136 (Europe).*Larus flavipes* MEYER, 1805, Wolf u. Meyer, 'Naturg. Vög. Deutschl.,' II, p. 32, Pl.*Laroides melanotus* BREHM, 1830, Isis, p. 993.*Laroides harengorum* BREHM, 1830, Isis, p. 993.*Dominicanus fuscescens* BRUCH, 1853, Journ. für Orn., p. 100.*Laroides α nigrodorsalis* BREHM, 1855, Naumannia, p. 294.*Laroides β assimilis* BREHM, 1855, Naumannia, p. 294.*Larus fuscus macropterus* A. E. BREHM 1866, 'Verz. Samml.,' p. 14.*Larus medius* SAUNDERS, 1878, Proc. Zoöl. Soc., p. 173.? *Larus intermedius* SCHIØLER, 1922, Dansk. Orn. For. Tidskr., XVI, p. 21.*Larus fuscus affinis*—British Lesser Black-backed Gull[*Larus*] *cachinnans* LICHTENSTEIN, 1854, 'Nomencl. Av.,' p. 99.*Larus affinis* REINHARDT, 1853, 'Vid. Medd. Nat. Forh. Kjöbenhavn,' p. 78 (Julianehaab, Greenland).*Larus rufescens* BONAPARTE, 1854, Naumannia, p. 211.[*Clupearus*] *fuscescens* BONAPARTE, 1857, 'Consp. Av.,' II, p. 221.*Larus graellsii* A. E. BREHM, 1857, Naturh. Zeit., n.f., III, p. 483.*Larus occidentalis* HUME, 1873, 'Stray Feath.,' p. 273.*Larus marinus* ALSTON AND HARVIE-BROWN, 1873, Ibis, p. 52.*Larus borealis* SEEBOHM, 1882, Ibis, p. 386.*Larus fuscus brittanicus* LOWE, 1912, 'Brit. Birds.,' VI, p. 3.*Larus fuscus taimyrensis*—Siberian Lesser Black-backed Gull? *Larus littoreus* FORSTER, 1781, 'Indian Zoöl.,' p. 42.*Larus fuscus* HUTTON, 1847, Journ. Asiat. Soc. Beng., XV, p. 792.*Larus affinis taimyrensis* BUTURLIN, 1911, 'Messag. Orn.,' (Russian), p. 149 (Gulf of Yenisei, Siberia).*Larus fuscus antelius* IREDALE, 1913, Bull. Brit. Ornith. Club, XXXI p. 69.*Larus fuscus atlantis*—Azorean Lesser Black-backed Gull*Larus argentatus* GODMAN, 1866, Ibis, p. 103.*Larus fuscescens* SCLATER, 1867, Proc. Zoöl. Soc., p. 315.*Larus leucophæus* DRESSER, 1873, 'Birds Eur.,' VIII, p. 411, part.*Larus cachinnans* SEEBOHM, 1887, Ibis, p. 351.*Larus fuscus atlantis* DWIGHT, 1922, Amer. Mus. Novit., No. 44 (Azores).

DISTRIBUTION

The breeding range of *fuscus* is chiefly shores and islands of the Baltic Sea and the adjacent lakes of Russia north to the White Sea; *taimyrensis* extends from the White Sea along the Russian and Siberian coasts to the Taimyr Peninsula; *affinis* is confined to the British Isles and adjacent islands (Faroe, Channel) and Iceland (?); and *atlantis* is resident on the

MEASUREMENTS

MALES

	No of Specimens	Wing	Tail	Tarsus	Toe With- out Claw	Culmen	Bill at Base	Bill at Angle
<i>Larus fuscus</i> <i>affinis</i> <i>taimyrensis</i> <i>atlantis</i>	13	415-438 (425.6)	152-169 (159.8)	58-66 (63.6)	45-52 (49.2)	49-55 (52.4)	15-18 (16.2)	16-19 (16.7)
	11	394-428 (411.6)	152-167 (159.5)	63-69 (65.7)	47-53 (50.1)	49-56 (53.1)	16-19 (17.3)	16-19 (17.8)
	6	433-453 (442.7)	168-175 (173.3)	69-71 (69.8)	53-55 (54.5)	55-60 (56.8)	18-19 (18.3)	18-19.5 (18.4)
	12	408-428 (420.5)	162-178 (171.0)	63-68 (66.3)	52-58 (55.2)	51-57 (54.3)	17-19.5 (18.4)	18-20.5 (19.2)

FEMALES

<i>Larus fuscus</i> <i>affinis</i> <i>taimyrensis</i> <i>atlantis</i>	8	394-410 (402.4)	142-159 (150.1)	57-60 (59.1)	42-47 (45.4)	45-48 (46.2)	14-16 (14.9)	14-17 (15.4)
	4	382-393 (388.5)	151-158 (154.7)	57-61 (59.5)	42-45 (44.0)	44-50 (47.0)	14-15.5 (14.9)	15-16.5 (15.9)
	3	410-430 (421.7)	158-165 (161.0)	66-67 (66.6)	49-52 (50.7)	50-55 (52.3)	16-16 (16.0)	16-17 (16.5)
	8	395-407 (402.2)	153-170 (161.9)	59-66 (61.6)	51-54 (52.2)	48-54 (50.2)	16-18 (17.1)	16.5-19 (18.1)

islands and coasts of northwestern Africa including the Azores, Madeira, Canary and perhaps the Cape Verde groups. In winter *fuscus* ranges down the western coast of Africa as far as Sierra Leone and throughout the Mediterranean Sea to Palestine and Egypt and probably up the Nile to the eastern Congo; *taimyrensis* ranges to the Red Sea, the Persian Gulf, the Arabian, the Persian, Baluchistan (Mekran) and the western coasts of India; *affinis* reaches the Atlantic and Mediterranean coasts, near the Straits of Gibraltar; and *atlantis* probably seldom wanders far from its breeding range.

MOULTS AND PLUMAGES

Natal Down

REFERENCE SPECIMEN.—H. F. Witherby, No. 589; ♂; June 29, 1912; near Wark, Northumberland, England.

BACK grayish with dusky spotting in blurred lines. HEAD similar with more distinct spots in lines from the base of the bill. UNDERPARTS grayish, unmarked, except for a few spots on throat. BILL (see color plate in 'British Birds,' 1914, p. 306), in skin, basal two-thirds dull black with brownish flesh-colored tip. LEGS AND FEET, in skins, dusky flesh. IRIS deep brown.

Very similar to *argentatus*, perhaps averaging darker, especially in the dark races. An excellent colored plate of the head of *affinis* at different ages is in 'British Birds,' VII, April 1914, pp. 306–312, Pl. XVIII, from the brush of Mr. E. Alexander.

Juvenal Plumage

Figures 131 and 132

REFERENCE SPECIMENS.—J. D., No. 52902; August 10, 1922; Lancashire, England. J. D., No. 53081; December 2, 1921; Fayal, Azores.

BACK AND MANTLE-AREA clove-brown with pale buff edgings, the feathers fairly solid in color with very obscure if any mottling, even on the tertials; rump dull white, heavily barred. HEAD grayish white, thickly though indistinctly streaked with clove-brown, becoming heavily or coarsely spotted on the nape; dusky eye-crescent, chiefly of feathers with bristle-like black tips; the forehead and lores slightly paler, finely streaked or flecked. UNDERPARTS dull white, obscurely barred with clove-brown, more heavily barred on the sides and crissum, the bars more or less incomplete on the feathers and veiled with broad white tips; chin and anal region white; under tail-coverts white irregularly and partly but decidedly barred. WINGS: primaries brownish black, the tips pointed, the inner slightly paler at tips and on inner webs; primary coverts, alula and secondaries similar, the secondaries with inconspicuous dull whitish or buffy tips and mottlings or spots on inner webs of proximal quills; tertials similar but with better defined, whiter edgings; greater coverts clove-brown with buffy edgings and mottlings on the inner feathers forming a dark wing-bar; median coverts with buffier edgings; under wing coverts and edge of wing grayish white incompletely barred with brown, the reversed row grayish with mottling; the axillars grayish white, brown-barred. TAIL basally white, the median rectrices irregularly barred or mottled,

the outer more extensively white and spotted with brownish black. The rather few spots are somewhat elongated especially on the outer web of the outer pair which is also the whitest pair. The terminal fourth of the tail is largely a solid black band with a very narrow buffy white tip like the adjacent edgings. There is much variation in the tail but the spotted rather than barred effect is quite different from other styles of tail pattern. BILL (see colored plate in 'British Birds,' 1914, p. 306); in skin, dull black, a small flesh-brown area at base of mandible. LEGS AND FEET pale brownish flesh (Witherby); in skin, yellower. IRIS brown; eyelids flesh-colored (W.), in skin, black.

Compared with *argentatus*, the races of *fuscus* have the wings and tail blacker (unless faded), the mantle-area with less notching and "watering" of the feathers and the underparts whiter with bolder darker markings. The tail pattern is usually quite diagnostic, having large areas of white which are spotted rather than barred, but there are birds that are much like European *argentatus*; the brown wing-bar of the greater coverts, however, is usually more distinct and less mottled. The palest race (*atlantis*) in this plumage is dark enough in tone to be similar to *californicus* and *occidentalis*, but with a tail quite different from either in pattern; *californicus* too differs in having the bill abruptly black-tipped and the head and neck darker.

First Winter or Non-nuptial Plumage

REFERENCE SPECIMENS.—J. D., No. 52885; ♂; February 18, 1921; Fayal, Azores.

Acquired by a partial postjuvenal moult in September and October, plus wear.

BACK a rather paler, grayer brown than the juvenal, the edgings fusing more into the brown. HEAD AND NECK paler than the juvenal, the brown central areas of the feathers more restricted. UNDERPARTS whiter especially the chin, throat and breast. WINGS AND TAIL of the juvenal plumage are retained. BILL AND OTHER SOFT PARTS show little change from the juvenal.

First Nuptial Plumage

REFERENCE SPECIMEN.—Data lacking.

Acquired by a partial prenuptial moult in March and April plus wear of the remains of the first winter body plumage and of the retained juvenal wings and tail. The new feathers of the head, throat, and breast are much like those of the first winter, although birds usually become whiter about the head, and may even show some signs of gray on the back. Bill and other soft parts like the winter (see 'Brit. Birds,' 1914, p. 306).

Second Winter or Non-nuptial Plumage

Figures 133 and 134

REFERENCE SPECIMEN.—Data lacking.

Acquired by a complete postnuptial moult in July, August, and September, sometimes beginning as early as May.

BACK AND MANTLE-AREA clove-brown, grayer than in the first winter, the edgings paler; and some gray or dark feathers like the adult varying greatly in amount. HEAD AND NECK whiter than in the first winter, less thickly but more sharply or narrowly streaked; eye-ring white; eye-crescent dusky. UNDERPARTS chiefly white, streaked more or less on throat and sides. WINGS: primaries much like first winter, but the tips rounded with the inner quills more or less grayish. TAIL with much basal white and diminished finer spotting than in the first winter; a freckled, and sometimes a blurred or "fogged" effect. BILL brown-black with base pale brown or pinkish (Witherby); in skin, yellowish flesh base and at extreme tip dull black beyond angle. LEGS AND FEET pale creamy flesh with yellowish (W.); in skin, dull yellowish brown. IRIS dark olive-brown (W.).

Some birds are quite like those of the first winter; others show a greater or lesser amount of gray in the mantle, by which it is possible to recognize the races. Those which do not show gray may be distinguished from first year birds by the rounded tips of the primaries and the squarer tips of the rectrices.

Second Nuptial Plumage

REFERENCE SPECIMEN.—J. D., No. 49075; Morocco; passing into third winter but retaining four old primaries, five old rectrices, and worn body plumage of second year.

Acquired by a partial prenuptial moult in March and April. Wings and tail of the second winter retained.

HEAD, NECK, THROAT AND BREAST are whiter than the first winter. BILL basal two-thirds and extreme tip dull ochre-yellow; the tip black-banded; gape yellower; LEGS AND FEET yellowish. IRIS brown; eyelids red *ex* labels.

Third Winter or Non-nuptial Plumage

Figures 135 and 136

REFERENCE SPECIMENS.—J. D., No. 49080; September 28, 1887; Tangier, Morocco; near the end of the moult having but two old primaries and one old second year freckled rectrix of the second pair; the rest of the new rectrices mostly white, the outer pair smudged faintly, the bill is adult with a red spot at the angle. J. D., No. 52884; ♂; March 10, 1922; Fayal, Azores.

Acquired by a complete postnuptial moult in August and September.

MANTLE, usually gray to grayish black like the adult, sometimes brownish or slightly mixed with brown freckling. HEAD AND NECK largely white with diminished dusky streaking which becomes large blurred spots on the nape and sides of the throat. UNDERPARTS white, sometimes with faint dusky streaking on the

throat. WINGS: primaries black with small white apical spots larger on the inner quills, sometimes lacking, the outer (tenth) with a more or less distinct mirror, tongues of dull gray on the inner webs of the inner primaries as far outward as the seventh to ninth depending on the race. Backward birds lack apical spots, the mirror and the tongues, although the last are usually imperfectly developed. TAIL mostly white with dull black subterminal spots or smudges and shaft streaks, sometimes with much smudging or "fogging" and sometimes wholly white. BILL (see colored plate in 'British Birds,' 1914, p. 306); in skin, usually yellowish with an ill-defined dusky band or clouding at the angle and occasionally the red spot begins to show. LEGS AND FEET creamy to yellowish flesh (Witherby); in skin, yellowish flesh. IRIS paler brown than when younger; eyelids pale red (W.).

Third Nuptial Plumage

REFERENCE SPECIMEN.—J. D., No. 52884; ♂; March 10, 1922; Fayal, Azores; new white among the old worn and streaked feathers of the head.

Acquired by a partial prenuptial moult in March and April.

Differs little from the winter except that the head is white, usually unstreaked, and the mantle and throat are fresh and new. WINGS AND TAIL of winter plumage retained. BILL AND OTHER SOFT PARTS with more color than in winter.

Fourth Winter or Non-nuptial Plumage (Adult)

Figures 137 to 142

REFERENCE SPECIMENS.—Brit. M., 1922.3.9.2; January 17, 1922; Freetown, Sierra Leone, and others from Egypt, etc. J. D., No. 52882; ♂; January 12, 1922; Fayal, Azores.

Acquired by a complete postnuptial moult at the peak in August and September, though often later.

MANTLE slaty to sooty black in *fuscus*, dark neutral gray in *affinis* and *taiyrensis* and deep neutral gray in *atlantis*. HEAD AND NECK white, sometimes with slight dusky streaking. UNDERPARTS white. WINGS: primaries black with white apical spots, a mirror on the outer, rarely one on the next and dark gray tongues often short, that leave a large part of them black. In *fuscus* and *atlantis* the tongues scarcely show on the three or four outer; in *affinis* and *taiyrensis* they show up to the eighth or ninth and less often, basally, on the tenth (outer). Primary coverts, alula, secondaries, tertials and coverts like the mantle, the secondaries and the tertials broadly tipped with white; lining and edge of wing white. BILL (see colored plate in 'British Birds,' 1914, p. 306), in skin, chrome-yellow with a large red spot at angle; occasionally slight dusky clouding at angle suggesting a band. LEGS AND FEET lemon or bright yellow (Witherby). IRIS pale straw-yellow; eyelids red to vermilion (W.).

Probably most birds attain adult plumage at this moult. A few show slight evidences of immaturity in dusky shaft streaks on the primary coverts, slight smudges on the tertials or tail or in a blurred mirror on the outer primary. The species has a four-year plumage-cycle.

Fourth Nuptial Plumage (Adult)

REFERENCE SPECIMENS.—J. D., No. 24390; ♀; July 1903; Bona, Algeria. Tring Mus.; ♀; May 26, 1895; Gotland, and August 9, 1890, North Oland, Sweden.

Acquired by a partial prenuptial moult in March and April.

The new head and neck are white without streaking; otherwise like the winter, the winter wings and tail retained. Bill and other soft parts brighter colored than in winter (see 'Brit. Birds,' 1914, p. 306).

SUMMARY

Four geographical races of the Lesser Black-backed Gull are here recognized: (1) *fuscus*, (2) *affinis*, (3) *taimyrensis*, and (4) *atlantis*. In natal down they are indistinguishable, although in a series *fuscus* should prove to be darkest. In juvenal plumage, too, they are much alike but usually distinguishable from *argentatus*, with which they are most likely to be confused, by the tail pattern which is more spotted than barred, and by the darker general tone which is dusky rather than grayish. In the second and later years the depth of color in the mantle separates them from *argentatus* or *cachinnans* and from one another, *fuscus* being much the darkest, almost black with a slender tarsus and bill; *affinis* and *taimyrensis* being larger and with much grayer mantles and *atlantis*, also large with the palest mantle and with largest legs, feet and bill, features often found in island races. The sooty, almost black mantle of *fuscus* becomes very brown with wear, the gray of the others changing much less. The four races of the *fuscus* group are alike in possessing yellow feet and a wing-pattern with very little white or gray, this being restricted usually to short inconspicuous gray tongues on the inner primaries and a single white mirror on the tenth (outer). Rarely does a second mirror develop on the ninth as is regularly the case in the *argentatus* group (which also has extensive tongues of paler gray, the black area of the wing being greatly reduced). The gradation from nearly black to pale gray in the mantle of this species is striking but continuous, so that extremely unlike birds can only be considered as different geographical races of one species.

These yellow-footed gulls, although recognized and named as long ago as 1758 by Linnæus, have been the source of endless confusion and of many nomenclatural casualties, equalling in this respect the Herring Gulls. *Larus cachinnans*, *Larus ichthyaetus* and *Gabianus pacificus* are the only other yellow-footed gulls of somewhat similar size besides those of the *fuscus* group.

(1) *fuscus* (wing-pattern, Fig. 137).

This is the darkest and smallest of the four and the earliest recognized being named by Linnæus in 1758.

(2) *affinis* (wing-pattern, Fig. 140).

The type is in the Royal Museum of Copenhagen, Denmark.

The race *affinis* was long supposed to be a species and was described as such in 1853 by Reinhardt from a single wandering specimen taken in Greenland far out of its normal range, and this bird, mounted, rested in the Royal Museum of Copenhagen until Iredale (1923) compared it with British specimens which proved to be identical. The British bird, however, had, prior to this discovery, been named "*britannicus*" (Lowe, 1912), a name which must give way to the earlier name *affinis*. The wing-pattern of Lowe's type is shown by Fig. 141.

(3) *taimyrensis* (wing-pattern, Figs. 141 and 142).

This, the most northern and largest race, was named *antelius* (Iredale, 1913), but Buturlin's name has a couple of years priority. It differs from *affinis* only in size. A somewhat brief review (Dwight, 1919) deals with these matters and since then I have been able to examine the types of "*britannicus*" (Fig. 141) and of "*antelius*" (Fig. 142) now in the British Museum collection. This large race is most likely to be confused with *Larus cachinnans*, from which it may be separated when adult by size and by the darker mantle and in the first year by the darker tone with less white in the tail. Some specimens, however, almost defy allocation, as a large series now in the British Museum from the Persian Gulf and adjacent coasts, where the two species mingle in winter, clearly shows. Fortunately, *Larus argentatus vegæ*, with which it also might be confused, does not reach this region but migrates apparently to the Pacific coast of Asia and this simplifies the identification of both old and young birds.

(4) *atlantis* (wing-pattern of type, Fig. 139).

The type is in The American Museum of Natural History (L. C. Sanford, No. 14304; ♂; March 10, 1922; Fayal, Azores).

This pale race was confused with *Larus argentatus* for many years and later with *Larus cachinnans* and it is difficult, in fact impossible, to disentangle many of the records that concern these species.

Godman (*Ibis*, 1866, p. 103) recorded seeing a large flock at the Azores in June and later (*Ibis*, 1872, p. 222) records other birds that he supposed were *argentatus* as resident at Madeira and the Canaries. Probably Loche (1867) in recording *argentatus* from Algeria may have had in hand some of this race, and breeding birds from Portugal mentioned by Tait (*Ibis*, 1887, p. 395) may perhaps belong here. Dresser

(1873) refers some of his birds to "*leucophæus*" (= *cachinnans*). Sclater (Ibis, 1874, p. 100) records a specimen taken at Mogador as "*leucophæus*," which originally (see Proc. Zool. Soc., 1867, p. 315) was recorded as "*Larus fuscescens*." Irby (1875; 1895, also puts specimens of "*cachinnans*" on record that may well prove to be *atlantis*. Ogilvie-Grant (1890, Ibis, p. 444) records breeding specimens of "*cachinnans*" from Madeira, and the latest writer is Bannerman (1922), who states that "*Larus argentatus cachinnans*" breeds on Roque del Este and Anaga Rock (Tenerife).

Since describing this new subspecies, my conclusions have been reinforced by the examination of some twenty-five additional specimens in the British Museum and the Tring Museum, including breeding birds from the Canary and perhaps the Cape Verde Islands; and besides these a larger series has reached the American Museum, so that nearly every month in the year is now represented. Adults, because of their yellow feet, cannot be confused with *argentatus* and, while they share this character with *cachinnans*, they lack on the primaries the large white areas or tongues of this species or the gray tongues of *argentatus*, having black quills with, at most, a mirror on the tenth (outer), and with the tongues lacking on the three or four practically black distal quills. There is infrequently a mirror on the ninth primary in *affinis* but I have not seen one in *atlantis*. It is not surprising for this island-form, like many others, to have a heavy bill, tarsus, and feet; and the deep neutral gray of the mantle is only exceeded in paleness by *cachinnans*. Mediterranean, chiefly winter specimens of *cachinnans*, especially when not fully adult, are very close to *atlantis* both in color of mantle and in wing-pattern.

Summing up the evidence, it is clear that *atlantis* is not a Herring Gull (*argentatus*) because of its yellow feet and lack of primary pattern, but it is certainly allied closely to the Lesser Black-backed Gull (*fuscus*) because of these very characters. Another race, "*intermedius*," has been described quite recently by Schiøler (1922) from Norway and Denmark. Six breeding, June specimens from Bergen that I have examined do not confirm this separation for they are among the darkest of many examined. A curious fact that stands out is that *affinis* and *taimyrensis* with equally pale mantles are separated by the darker form *fuscus*. The conditions that bring this about have never been satisfactorily explained and naming an intermediate form only confuses the issue.

Larus occidentalis

Plate XII; Figures 143 to 154

Western Gull

Larus occidentalis occidentalis—Gray-backed Western Gull

Larus occidentalis AUDUBON, 1839, 'Orn. Biog.,' V, p. 320 (Cape Disappointment, Washington).

Larus fuscus SAUNDERS, 1875, Proc. Zoöl. Soc. London, p. 158.

Larus occidentalis livens—Dark-backed Western Gull

Larus occidentalis livens DWIGHT, 1919, Proc. Biol. Soc. Wash., XXII, p. 11. (San José Island, Gulf of California.)

? *Larus occidentalis* LAWRENCE, 1858, 'Rep. Pac. R. R. Surv.,' IX, p. 845.

DISTRIBUTION

The breeding range of the race *occidentalis* includes the rocky islands of the coasts of Washington, Oregon, and northern California to the Farallon Islands; that of the race *livens* extends south from the Santa Barbara Islands to islands off both coasts of Lower California, including Los Coronados, Todos Santos, San Martin, San Geronimo, Guadalupe, Cedros, Natitividad, San Roque, Asunsion, and San José. In winter, *occidentalis* frequents the western coast of the United States as far south as Los Angeles County, California; *livens* southward on the coast of Mexico to about Latitude 20° N.; casual records are Vancouver Island, Colorado, and Socorro Island.

MOULTS AND PLUMAGES

Natal Down

REFERENCE SPECIMENS.—J. D., No. 52865; May 31, 1920; Santa Barbara Islands, California. L. B. B., No. 29280; ♂; June 18, 1916; Trinidad, California.

BACK AND WINGS grayish buff, distinctly spotted or lined with clove-brown. HEAD paler and buffier, with inky black spotting. UNDERPARTS paler than back, buffy on throat, the flanks and anal region with obscure dusky mottling; a few large black spots on the sides of the chin and upper throat. BILL, in skins, black basally for about two-thirds of the distance to the tip which with the egg-tooth is brownish flesh. LEGS AND FEET, in skins, black. IRIS "brown" (*ex* label).

Resembles most *glaucescens* or *marinus* in the blackness of the markings; *delawarensis* and *argentatus* are browner and paler; *californicus* is paler with a white head.

Juvenal Plumage

Figures 143 and 144

REFERENCE SPECIMENS.—A. M. N. H., No. 47189; ♂; October 30, 1889; Cape Disappointment, Washington. L. B. B., No. 33038; ♀; August 11, 1911; Monterey County, California.

MEASUREMENTS

MALES

	No of Skins	Wing	Tail	Tarsus	Toe With- out Claw	Culmen	Depth at Base	Depth at Angle
<i>occidentalis</i> <i>livens</i>	8	400-420 (412.3)	166-177 (170.0)	65-74 (69.2)	54-65 (59.8)	52-58 (55.6)	19-21 (20.0)	19-22 (21.2)
	15	395-445 (413.1)	152-167 (160.5)	66-72 (68.3)	58-62 (59.9)	50-59 (54.6)	18-22 (19.6)	19-23 (20.8)

FEMALES

<i>occidentalis</i> <i>livens</i>	11	384-408 (397.6)	150-168 (159.9)	64-71 (66.5)	53-64 (57.5)	49-55 (52.7)	17-20 (18.3)	17-22 (20.0)
	11	380-398 (389.9)	147-155 (150.0)	61-65 (63.3)	52-58 (55.5)	46-53 (49.8)	16-18 (17.2)	18-20 (19.0)

BACK AND MANTLE-AREA much like *argentatus* but darker, the feathers more solidly clove-brown, with much narrower edgings and less obvious barrings and mottlings. HEAD AND NECK darker than *argentatus* the edgings narrower and almost lacking on the nape, streakings narrower and less defined; eye-ring and eye-crescent dusky. UNDERPARTS usually more coarsely barred or mottled than average *argentatus*; chin flecked or lightly barred. WINGS darker in tone than *argentatus*. Primaries pointed, brownish black or deep clove-brown, secondaries similar, narrowly tipped with white; tertials broadly tipped and "watered"; primary coverts and alula dull black, greater coverts browner, mottled and narrowly edged with grayish buff; other coverts like back; wing-lining and axillars clove-brown obscurely mottled. TAIL dull black with a little white speckling at the extreme bases of the rectrices and on the outer web of the external pair which is usually quite gray. BILL (see Pl. XII, fig. 1) "black, pale-cinnamon-pink or avellaneous at base of mandible; gape light purplish vinaceous" (Bishop); in skin, dull brownish black except a small basal area yellowish brown, extending on the rami. LEGS AND FEET (see Pl. XII, fig. 1) "light brownish or cinnamon-drab" (B.); in skin, a yellowish brown. IRIS (see Pl. XII, fig. 1) "brown (Prout's, auburn or sepia), eyelids black" (B.).

Can only be confused with *argentatus* of like age, especially the small race, *thayeri*; but size, combined with the fairly solid color of the tail, will almost always differentiate the two; the spotting of the tail is finer and more of a speckling than in any other species and sometimes it is almost wholly lacking, especially on the outer web; *californicus*, too, is smaller and has a bill which is smaller and with a sharply-defined inky tip, not fusing into the pale base as in *argentatus*.

First Winter or Non-nuptial Plumage

REFERENCE SPECIMENS.—A. M. N. H., No. 47182; ♀; October 27, 1889; Cape Disappointment, Washington. J. D., No. 31327; ♀; December 18, 1911; Pacific Grove, California.

Acquired by a partial postjuvenal moult in September, October, and November.

BACK grayish clove-brown, grayer than the juvenal, the feathers with the brown fusing into the grayer tips without the juvenal mottling. HEAD AND NECK slightly paler than the juvenal. UNDERPARTS somewhat paler than the juvenal, the chin whiter; the retained, as well as the new feathers, through wear, showing the barring more distinctly and giving a heavily spotted effect, coarser than in *argentatus*. WINGS AND TAIL of juvenal plumage retained. BILL AND OTHER SOFT PARTS like the juvenal.

First Nuptial Plumage

REFERENCE SPECIMEN.—L. B. B., No. 33024; ♀; May 2, 1922; Los Angeles County, California.

Acquired by a partial prenuptial moult, not including the wings or tail, in March and April; the new back, head and throat, paler but much like the winter. Bill and other soft parts much like the winter.

Second Winter or Non-nuptial Plumage

Figures 145 and 146

REFERENCE SPECIMENS.—A. M. N. H., No. 68867; ♀; August 3, 1891; Monterey, California; one old primary left, tail and body new. J. D., No. 32980; ♀; November 22, 1912; Pacific Grove, California.

Acquired by a complete postnuptial moult in August and September.

BACK AND MANTLE-AREA brown like the first winter and usually with a scattering (sometimes a large patch) of gray or partly gray feathers, that sometimes also appear sparingly among the lesser coverts and tertials. HEAD whiter than in the first winter, especially the forehead, and somewhat less heavily streaked; neck also whiter with broad indistinct stripes; eye-ring and eye-crescent dusky. UNDERPARTS much whiter than in the first winter, the barring less distinct and often a dusky clouding, as if the bird had been rubbed in mud. WINGS: primaries, with rounded tips (and no mirror), the three or four proximal quills paling slightly at the tips and on the inner webs a little paler than the first winter; primary coverts similar; secondaries grayer than in first winter and whiter edged, with freckling very fine; tertials with a little coarse freckling, other coverts brown with indistinct frecklings chiefly on the greater; lining of wing largely clove-brown, axillars grayer with mottlings. TAIL with considerable white basally, the outer web of the outer rectrix, much obscured, freckled or "fogged" with clove-brown, the median rectrices nearly wholly dusky. Some tails are nearly solid in color like the first winter but with finer freckling of the white areas; tail-coverts largely white but usually with blurred, dusky markings. BILL "black in front of nares, tipped with whitish, basal half of maxilla brownish olive-buff, of mandible light vinaceous fawn, gape pinkish white" (Bishop); in skin, largely dusky or brownish with yellowish-flesh base which is yellower and larger in area on the mandible. LEGS AND FEET "vinaceous buff or fawn" (B.); in skin, yellowish or brownish flesh-color. IRIS "Dresden-brown, raw umber and other browns" eyelids drab, or hair-brown (B.).

Second Nuptial Plumage

REFERENCE SPECIMENS.—J. D., No. 9334; ♀; June 4, 1903; Monterey, California. L. B. B., No. 33010; ♂; June 23, 1923; Monterey County, California.

Acquired by a partial prenuptial moult, not including the wings or tail in March and April.

New gray on mantle and new white on head, usually with flecking, and underparts not different from the old. BILL "cream-color, orange or chrome-yellow blackish on maxilla before nares, tipped with white; salmon-orange to scarlet spot; gape pinkish white or buff" (Bishop). LEGS AND FEET "pale pinkish buff" (B.). IRIS "Sudan, or buckthorn-brown; eyelids, light orange-yellow" (B.).

Third Winter or Non-nuptial Plumage

Figures 147, 148, and 154

REFERENCE SPECIMENS.—J. D., No. 32969; ♀; October 9, 1912; Pacific Grove, California. L. B. B., No. 33020; ♂; October 20, 1921; Monterey County, California.

Acquired by a complete postnuptial moult in August and September.

MANTLE gray, but brown-tinged especially on the greater coverts and tertials. HEAD AND NECK white, indistinctly barred or flecked with grayish brown, the nape largely white with cloudings; darker around and below the eye. UNDERPARTS white with only a little flecking on the throat. WINGS: primaries usually black with white tips and a small mirror on the outer (tenth), but they may be plain like the second year; secondaries partly dusky, broadly white-tipped; tertials similar; under wing-coverts and edge of wing mostly white or only brown-edged, axillars white. TAIL largely white, but variously smudged more or less with black; coverts white. BILL (see Pl. XII, fig. 3) "maize or pale orange-yellow, or cream-color; distal third black, tip white; gape bluish slate, pale flesh, white, or cream; tongue and mouth saffron-pink" (Bishop). LEGS AND FEET (see Pl. XII, fig. 3) "pale vinaceous fawn, avellaneous buff, or ivory-yellow" (B.). IRIS (see Pl. XII, fig. 3) "cream-color, Naples-yellow, or sulphur-yellow; eyelids salmon-orange, brownish or greenish, or cream" (B.).

Third Nuptial Plumage

REFERENCE SPECIMENS.—J. D., No. 9338; ♂; June 6, 1903; Monterey, California. L. B. B., No. 33054; ♀; April 25, 1922; Los Angeles County, California.

Acquired by a partial prenuptial moult, not including the wings or tail, in March and April. Much like the winter except for a pure white head.

BILL "light cadmium to deep chrome or orange-yellow, scarlet or orange spot, sometimes blackish near tip; gape pale pinkish buff, orange-tinged" (Bishop). LEGS AND FEET "pale pinkish buff" (B.). IRIS "sulphur-yellow, light ochraceous buff; eyelids light orange-yellow" (B.).

Birds resemble adults, and the moult of the head, clears away the winter flecking which diminishes with age. The bill may or may not lose the dusky tip. The retained winter primaries fade to brown and the new feathers of the back are still a little brown-tinged, but the brownness of the alula and primary coverts and perhaps tail-smudges may be the only evidence of immaturity. Some specimens with brown in the wings have pure white tails and primaries without apical spots (A. M. N. H., No. 142787; ♂; May 19, 1910; San Pedro, California). One bird has a heavily "fogged" tail, much brown in wings, a clouding at bill tip, no apical spots, but a good mirror on the primaries, otherwise adult (A. M. N. H., No. 68862; ♀; March 20, 1897; Monterey, California). These birds might possibly be backward fourth year, but this is not likely because the third year characters seem to predominate. In every large species there will be found some specimens whose age is questionable. One cannot be sure whether they are second or third year birds in some cases or whether third or fourth year in others.

Fourth Winter or Non-nuptial Plumage (Adult)

Figures 149 to 153

REFERENCE SPECIMEN.—J. D., No. 10015; ♂; January 4, 1910; Monterey, California.

Acquired by a complete postnuptial moult in August and September.

MANTLE neutral gray to much darker shade. HEAD AND NECK white, the latter sometimes lightly streaked, with grayish black. UNDERPARTS white. WINGS: the primaries black with broad white apical spots one mirror (or two) and gray tongues on all except the outer (tenth), the black reduced to a bar on the fifth, the fourth to first wholly gray with white tips; secondaries, tertials and scapulars gray, white-tipped. BILL (Pl. XII, fig. 2) "primuline or maize-yellow to deep chrome, mouth, gape and spot orange-chrome" (*ex label*), in skin, dull lemon-yellow with red spot at angle. LEGS AND FEET (Pl. XII, fig. 2) "live ochre" "flesh-colored with a creamy tinge" (*ex labels*); in skin, brownish flesh. IRIS (Pl. XII, fig. 2) "fuscous black, freckled with old gold"; eyelids "orange-chrome" (*ex labels*).

This species has a four-year plumage-cycle. Like other species with dark mantles, the head in winter adults is usually white.

Fourth Nuptial Plumage (Adult)

REFERENCE SPECIMENS.—J. D., No. 43112; ♂; July 31, 1915; Netarts, Oregon. L. C. Sanford, No. 3378; ♂; April 26, 1912; San José Island, Lower California (type).

Acquired by a partial prenuptial moult in March and April.

Does not differ materially from the winter plumage except in pure white head, although many of the body feathers are fresh and new; the retained winter wings and tail become worn. Bill and other soft parts somewhat brighter colored than in winter.

SUMMARY

The race *occidentalis*, compared with adult *livens*, has a paler mantle and the gray tongues are on more of the primaries. Juvenal birds seem to average a little paler.

The species is rather closely related to the Herring Gulls, especially *L. argentatus smithsonianus*, although it has a darker mantle and a heavier bill. It also resembles *californicus*, but has flesh-colored or whitish feet, never yellowish and the mantle is darker. The light form resembles *L. fuscus atlantis* closely except for the feet. The first year bird differs from *argentatus* in having the tail almost uniform in color with comparatively few spots, and from *californicus* in size of the bill and in having the black tip fuse gradually (not suddenly) into the pale basal portion. Other species are too large or too small to be considered.

The range of this species is a peculiar one, being a narrow belt perhaps thirty miles in width along a coast line of perhaps two thousand

miles. Any records of birds from outside of this linear range may well be questioned and will probably prove to be *californicus*, the only other species with which it is likely to be confused. In my original description of *livens* I quoted from an apparently original label on the type where the color of the feet was recorded as "yellow." This is perhaps a mistake, the color in freshly killed Californian birds being flesh-color or a creamy white that quickly results from cessation of the circulation which furnishes the pinkish tinge. This emphasizes forcibly the difficulties and dangers that beset the path of those who attempt to record at second hand the colors of soft parts.

The type of *occidentalis* (U. S. N. M. No. 2768; October 7, 1836, Cape Disappointment, Washington) was collected by J. K. Townsend, then sent to Audubon, and finally came to S. F. Baird and the U. S. National Museum, but it seems to have been lost, as I have been informed by the curator, Dr. Chas. W. Richmond. The wing-pattern of a typical bird is illustrated by Fig. 151.

The type of *livens* is in the private collection of Dr. L. C. Sanford (No. 3378; ♂; April 26, 1912; San José Island, Lower California) in The American Museum of Natural History; see Fig. 149.

***Larus dominicanus*¹**

Antarctic Black-backed Gull

Figures 155 to 166

Larus marinus LATHAM, 1790, 'Index Orn.,' II, p. 814, part.

Larus dominicanus LICHTENSTEIN, 1823, 'Verzeich. Doubletten,' part 2, p. 82 (Brazil coasts).

Larus fuscus KING, 1828, Zoöl. Journ., IV, p. 103.

Larus flavipes TEMMINCK, 1840, 'Man. d' Orn.,' 2d Ed., part 4, p. 472.

Larus littoreus FORSTER, 1844, 'Descr. Anim.,' p. 46.

Larus antipodus GRAY, 1844, 'List Birds Brit. Mus., Anseres,' p. 169.

Dominicanus pelagicus BRUCH, 1853, Journ. für Orn., p. 100.

Dominicanus vetula BRUCH, 1853, Journ. für Orn., p. 100.

Dominicanus vociferus BRUCH, 1853, Journ. für Orn., p. 100.

Larus verreauxii BONAPARTE, 1854, Naumannia, p. 211.

Dominicanus fritzei BRUCH, 1855, Journ. für Orn., p. 280.

Dominicanus azaræ (LESS.) BONAPARTE, 1857, 'Consp. Av.,' II, p. 214.

Lestris antarcticus ELLMAN, 1861, 'Zoöl.,' p. 7472.

Larus pacificus LAYARD, 1863, Ibis, p. 245.

¹The birds of the South Shetland Islands have been recently separated as *Larus dominicanus austrinus* (Fleming, 1924, Proc. Biol. Soc. Wash., XXXVII, p. 139.) I had already examined a series of these birds and, while a slight average difference from typical *dominicanus* was noticed, I did not think it sufficient for recognition. Specimens in fresh plumage are always grayer than worn birds and I found that a good many from the South Shetlands were indistinguishable from those in a series taken in South America and New Zealand.

DISTRIBUTION

Its range covers many islands of the Southern oceans and the southern coasts of Africa, South America, and New Zealand (not Australia). More or less resident where found and colonies are known on Crozet, Kerguelen, the Falkland, South Georgia, and South Shetland Islands and other groups on the western coast of South America, north to Ecuador; on the eastern coast north to Rio de Janeiro.

MEASUREMENTS

	MALES (10)	FEMALES (6)
Wing	403-422 (411.6)	372-404 (389.5)
Tail	168-185 (174.5)	152-165 (157.4)
Tarsus	63- 69 (65.9)	56- 70 (63.0)
Toe without claw	52- 56 (53.9)	45- 53 (49.7)
Culmen	46- 57 (51.8)	46- 53 (49.2)
Bill at base	18- 20 (19.2)	16- 18 (16.8)
Bill at angle	20- 22 (21.1)	18- 20 (18.8)

MOULTS AND PLUMAGES

Natal Down

REFERENCE SPECIMEN.—A. M. N. H., No. 132569; ♂; December 1, 1912; South Georgia Island; egg-tooth present.

BACK and proximal half of wing grayish buff obscurely and finely lined and spotted with dull clove-brown; rest of wing dull white. HEAD creamy buff with dull black linear spots, median only on forehead, in four broken lines on crown, also curving laterally on the nape, on lores, above, below and back of eye. UNDERPARTS grayish buff, more buffy on throat and crissum, the breast and chin decidedly white, unmarked except one or two irregular black spots on sides of the chin. The dark indistinct band across the throat is due to the basal gray of the down and an obscure mottling of the anal region is due to this. BILL black, whitish on ridge (Buller); in skin, basal two-thirds black merging into brownish flesh tip. LEGS AND FEET dark lead-color (B.); in skin, brownish or dusky flesh. IRIS black (B.).

In tone darker than *argentatus*, with finer, fewer markings on the back and more buffiness; the spots about the head clearer, smaller, and more abundant.

Juvenal Plumage

Figures 155 to 158

REFERENCE SPECIMENS.—A. M. N. H., No. 147302; ♂; February 25, 1917; Tofo, Chile; fresh juvenal. A. M. N. H., No. 132560; ♂; January 11, 1913; South Georgia Island; down partly adherent. B.-S., No. 2906; ♀; February 25, 1915; Punta Arenas, Chile. J. D., No. 53142; ♂; March 13, 1922; South Shetland Islands (64° S, 60° 30' W.).

BACK AND MANTLE-AREA clove-brown with broad pale buff edgings, notchings and mottlings, a slight obscure barring on some feathers; rump, upper and under tail-

coverts whiter, coarsely barred. HEAD AND NECK almost solidly dark and heavily streaked with clove-brown and dull white, broader rather blurred streaks on the hind neck; sides of head quite dusky, forehead paler. UNDERPARTS clove-brown with whitish edgings, more or less decidedly barred, chin slightly (often much) whiter, obscurely and narrowly streaked and the throat broadly streaked; anal region whiter. The feathers are white basally, then irregularly barred and finally tipped with buffy or grayish white. WINGS: primaries dull black, pointed, the inner five increasingly slightly paler or grayish at tips and a very little lighter on the inner webs; secondaries, primary coverts and alula similar; secondary coverts a duller brown tipped with buff, the inner chiefly with incomplete barring, some "watering" or mottling and more conspicuously buff; they form a striking broad dark wing-band which is seldom mottled except obscurely and is bordered on each side by paler buff; the lesser coverts, tertials and scapulars are like the back. TAIL, most of it dull black, very narrowly (about 5 mm.) tipped with buffy white, basally mottled and barred or spotted more boldly than in *argentatus* with grayish white; the outer web of the outer rectrix usually decidedly gray unlike the whiter inner web. The bars and spots are usually large and on a fairly large white or grayish area concealed by the coverts; the edgings bleach out very considerably both the buffs and the grays becoming whiter in the course of time. BILL "black" (*ex label*); in skin, almost wholly dull black, paling to a small area of brownish flesh at base of the lower mandible. LEGS AND FEET various shades "of olive and reddish brown" (*ex label*); in skin, brownish flesh, or dusky brown. IRIS "black" (*ex label*).

Average specimens are darker in tone and also darker about the head than either *argentatus* or *schistisagus*, the feather-pattern most like the former, but the tail usually has a grayer ground color and the spots coarse and rounded, the upper tail-coverts are also whiter than in the former; the chin more spotted resembling *occidentalis* in this respect. The tail-pattern is intermediate between the barring of the Herring Gulls (*argentatus*) and the spotting of the Lesser Black-backed Gulls (*fuscus*).

Some birds from the South Shetlands seem to be a little paler than average South American specimens.

First Winter or Non-nuptial Plumage

REFERENCE SPECIMENS.—J. D., No. 43979; ♂; August 4, 1914; South Georgia Island; worn specimen. B.-S., No. 555; ♀; May 5, 1913; Ancon, Peru.

Acquired by a partial postjuvenal moult, which takes place in South Georgia in January, February and later, often much later in more northern localities, where nesting occurs almost every month in the year.

BACK similar to the juvenal, but a paler, grayer brown, the color fusing more and the feathers with narrower grayish edgings. HEAD AND NECK whiter, but heavily streaked. UNDERPARTS whiter than the juvenal especially the chin and throat, but becoming more spotted or barred as the retained juvenal feathers wear and fade. Other specimens from Peru, Chile and Argentina are much whiter especially on underparts. WINGS AND TAIL of juvenal plumage retained, becoming worn. BILL AND OTHER SOFT PARTS like the juvenal.

First Nuptial Plumage

REFERENCE SPECIMEN.—B.-S., No. 4795; ♂; October 3, 1914; Mar del Plata, Argentina.

Acquired by a partial prenuptial moult, not including the wings or tail, in the fall months; at its peak from September to November in South Georgia Island.

New feathers of head, neck, back, throat, and breast are little if any different from those of the first winter, although some of those of the back sometimes show evidence of slatiness and the forehead generally is whiter. Bill and other soft parts much like the juvenal.

Second Winter or Non-nuptial Plumage

Figures 159, 160 and 162

REFERENCE SPECIMENS.—J. D., No. 41278; ♀; December 28, 1913; South Georgia Island; three old primaries still remaining. J. D., No. 53144; ♀; February 27, 1922; South Shetland Islands; primaries and tail not grown. B.-S., No. 2903; ♀; February 25, 1915; Punta Arenas, Chile; has one old juvenal primary remaining, the tail new; many other specimens are in non-nuptial plumage from June to October.

Acquired by a complete postnuptial moult that in South Georgia begins in December and is later in more northern localities.

BACK AND MANTLE-AREA partly a deep slaty black mixed largely with brown like the first winter, the mottlings fewer and finer, and edgings grayer. There is great variation from backs almost wholly black to those chiefly brown mottled. HEAD AND NECK very much whiter than the first winter, the streaking paler and narrower on the individual feathers, neck spotted or broadly streaked; forehead and lores largely white; eye-crescent black, partial eye-ring, posteriorly above and below eye white. UNDERPARTS largely white with brown streaks and spots more or less marked on the throat, sides of breast and flanks, the mid-abdomen often almost solidly brown. WINGS: primaries, with rounded tips, dull black, the proximal with narrow grayish tips and often obscure tongues on the inner webs; primary coverts, alula, and secondaries dull black with faint edgings, greater coverts evenly brown or a slight speckling near the narrow whitish edgings the mottling of the first winter usually lacking; wing-lining varies from largely white slightly brown-edged, to largely brown; axillars gray with brown mottling. TAIL: the white areas are much more extensive than the first winter, sprinkled or smudged with dull black. Some tails are much like the first winter and the rectrices less squarish at the tips. Others are basally white variously "fogged" or "peppered," gray on outer web of distal rectrix and much sprinkled with dull black where the white joins the solidly black extremities of the rectrices. Occasional specimens have a white rectrix, that suggests precocity or an accident at a time when the feather germ was ready to produce this mature feather. BILL "blackish and horn" (*ex* label); in skin, a yellowish brown flesh with irregular edged black band at and near angle. LEGS AND FEET "grayish brown" pale olive-buff" (*ex* label); in skin, dusky brown. IRIS "brown;" eyelids "black" (*ex* label).

Second Nuptial Plumage

REFERENCE SPECIMEN.—A. M. N. H., No. 132558; ♂; November 27, 1912; South Georgia Island.

Acquired by a partial prenuptial moult, not including the wings or tail, chiefly in August and September in South Georgia, and later in more northern localities.

New feathers of back, head, throat, and breast are much like the second winter but with the white edgings broader or the central brown reduced so that birds look whiter. The white head and yellow bill (sometimes duskiy clouded) are acquired in part. The advance towards maturity in this species seems to be more rapid than in other gulls of similar size and the bill at this stage sometimes has nearly lost its dusky marking. Other soft parts much like the winter or brighter.

Third Winter or Non-nuptial Plumage

Figures 163 and 164

REFERENCE SPECIMENS.—A. M. N. H., No. 132564; ♂; December 13, 1913; South Georgia Island, just beginning to moult. B.-S., No. 2902; ♀; February 12, 1915; Punta Arenas, Chile; nearly completed moult. J. D., No. 52420; ♂; June 23, 1913; Pisco Bay, Peru; with tail still growing. J. D., No. 53145; ♂; February 25, 1922; South Shetland Islands; primaries and tail not full-grown.

Acquired by a complete postnuptial moult in December, January, and February in South Georgia; later on the Chilean and Peruvian coasts.

MANTLE somewhat browner slaty black than in the adult. HEAD AND NECK white, flecked on the crown, more heavily on the nape and sides of neck with clove-brown, the feathers basally white with brown tips. The head is almost pure white in some birds. UNDERPARTS mostly white or with a little obscure barring or clouding chiefly on mid-abdomen. WINGS: primaries with white apical spots, also sometimes a small blurred mirror on the outer, often none, the proximal quills each with a pale slaty tongue and a subapical black bar, which is broad on the sixth (sometimes on the seventh or fifth) narrower on the fifth, on the fourth only a half bar, while the others are wholly slaty and white-tipped; primary coverts black; secondaries slaty with white tips; alula partly brown and partly white; greater, median and lesser coverts slightly browner than the back; tertials somewhat mottled; axillars white with dusky edgings; wing-lining and edge of wing white narrowly edged with brown. TAIL chiefly white with a few black smudges. There is much variation in the amount and distribution of the black which is usually concentrated in subterminal blotches chiefly on the inner webs of the median rectrices and diminishes or is lost on the outer quills. Backward tails are "fogged" like the second winter. BILL "brownish yellow, yellower tip, slight orange spot" (*ex* label); in skin, pale yellow, faintly banded or with dusky cloudings at and above the angle, often with a red spot. LEGS AND FEET "bluish gray" (*ex* label); in skin, a greenish or yellowish brown. IRIS "yellow-brown," "brown" (*ex* labels).

Third Nuptial Plumage

REFERENCE SPECIMEN.—B.-S., No. 1456; ♀; September 22, 1913; Corral, Chile.

Acquired by a partial prenuptial moult, not including the wings or tail, in September, October, and November.

New feathers of the head and neck are white, without markings; those of the throat and breast are also white like those they replace. Bill and other soft parts with more color than in winter.

Fourth Winter or Non-nuptial Plumage (Adult)

Figures 165 and 166

REFERENCE SPECIMEN.—B.-S., No. 2521; ♂; May 8, 1914; Ancud, Chile; still has one old primary showing lateness of this complete postnuptial moult on the Chilean coast; in South Georgia Island this is at its peak in January and February.

MANTLE slaty to sooty black, the darkest of any of the gulls. HEAD AND NECK white with narrow streaking on the crown. WINGS: primaries (except the tenth) with moderate-sized apical spots, and the tenth with a rather small mirror that varies in size and shape, a tongue indicated on the seventh, becoming clearer on the sixth and fifth where it develops into a grayish white crescent as it meets the black-banded tip, the fourth half-banded, broadly white-tipped, the third to first grayer and broadly white-tipped; secondaries grayer than the primaries broadly (25–35 mm.) white-tipped; tertials similar; primary coverts wholly brownish black; alula similar but white basally and towards edge of wing; edge of wing, coverts adjacent and lining white. TAIL pure white. BILL bright lemon-yellow with red spot at angle (Buller); in skin, duller and paler. LEGS AND FEET greenish yellow inclining to gray (B.); “bluish gray,” “yellow buff” (*ex labels*); in skin, yellowish dusky brown. IRIS “whitish,” “dirty straw”; eyelids “red” (*ex labels*).

Only one adult of thirty examined has a mirror on ninth primary, but regularly nearly the whole tip of the tenth is white. There is a distinct white area at end of the tongues on the seventh and sixth; the fifth has a half bar and much apical white; the fourth with a touch of black; the third to first dusky gray with broad white tips, basally there is grayish on the inner webs of all except the three outer. It is difficult to distinguish second year from third year birds, as they seem to advance faster than *argentatus*. The species has a four-year plumage-cycle.

Fourth Nuptial Plumage (Adult)

REFERENCE SPECIMEN.—J. D., No. 52418; ♂; September 22, 1913; Corral, Chile.

Acquired by a partial prenuptial moult, which produces the snowy head. Elsewhere, birds are like the fourth winter, with many new feathers of back, throat, breast, and on the sides, and scattered posteriorly. Wings and tail of winter are retained. Bill and other soft parts brighter than in winter.

SUMMARY

The size, bill, dark wing-pattern, and the tail-pattern of the young bird indicate relationship to the *Larus fuscus* group. In the first year the tail is more often spotted than barred, like *fuscus*, but more frequently on a grayer ground and the spots are usually rounded instead of elongated as in *Larus schistisagus*. Adults have the darkest mantle of any species of gull, resembling *marinus* in this respect. Freshly moulted birds are grayer because of a slight bloom that is later lost by wear. Worn birds are darker and browner. The original description is found in a catalogue of duplicate specimens for sale in the Lichtenstein Museum, showing that traffic in scientific bird-skins was in vogue a hundred years ago. I am told by Dr. R. C. Murphy that, along the South American coast, the bird is known as the "Kelp Gull," a short vernacular name that claims attention, but popular names are like language and survive only if they fill a general demand.

Larus schistisagus

Slaty-backed Gull

Figures 167 to 178

Larus argentatus MIDDENDORF, 1851, 'Reise, Sibir., Zoöl.,' p. 243, part.*Larus cachinnans* KITTLITZ, 1858, 'Denkw. Reise,' I, p. 336.*Larus occidentalis* WHITELY, 1867, Ibis, p. 210.? *Larus fuscescens* MEVES, 1871, 'Oefv. Ak. Förh.,' p. 787.? *Larus borealis* GRAY, 1871, 'Hand-List.,' III, p. 113, No. 10976.*Larus marinus* SWINHOE, 1874, Ibis, p. 165.*Larus pelagicus* TACZANOWSKI, 1876, Bull. Soc. Zool. France, p. 263.? *Larus affinis* SEEBOHM, 1879, Ibis, p. 24.*Larus schistisagus* STEJNEGER, 1884, Auk, I, p. 231 (Bering Island, Kamchatka).

DISTRIBUTION

The breeding range includes the shores and islands of the Sea of Okhotsk, Kamchatka, and eastern Siberia north to Plover Bay. The winter range includes the coast of northern Japan and there are records of stray birds at several points in Alaska (Unalaska, Port Clarence, Sitka), at Franklin Bay, Mackenzie, and at the Diomedes and Herald Islands.

MEASUREMENTS

	MALES (8)	FEMALES (11)
Wing	430-447 (440.1)	405-426 (416.0)
Tail	185-197 (190.5)	165-184 (177.0)
Tarsus	63- 72 (68.1)	60- 69 (63.5)
Toe without claw	54- 61 (57.1)	51- 56 (53.2)
Culmen	56- 60 (58.7)	49- 55 (52.4)
Bill at base	19- 22 (20.5)	18- 20 (18.6)
Bill at angle	19- 22 (20.6)	18- 20 (18.8)

MOULTS AND PLUMAGES

Natal Down

REFERENCE SPECIMEN.—A. M. N. H., No. 76770; July 23, 1901; northeastern Siberia. Half-grown with much of the down adherent to the tips of the feathers of the juvenal plumage. The worn head and neck are still wholly in the down, now a dingy buffy white with dull black spots sparingly distributed on the middle of the forehead and on the lores adjacent, on the crown, occiput and above the eyes, and on sides of throat. Underparts a dingy grayish white, obscurely clouded posteriorly. Back, scapulars, wings, tail and coverts mostly dusky juvenal feathers with rich ochraceous-buff edgings with down adhering in a few places. Wing quills about 90 mm. long, tail about 50 mm. Sides of breast mostly juvenal with much grayish down adhering. Bill and feet not different from *argentatus*, which this specimen most resembles.

Juvenal Plumage

Figures 167 to 169

REFERENCE SPECIMENS.—A. M. N. H., No. 76701; ♀; August 21, 1900; Gichiga, northeastern Siberia. A. M. N. H., No. 76705; ♀?; October 3, 1900; Gichiga.

BACK AND MANTLE-AREA pale clove-brown, the feathers with broad edgings and hidden irregular bandings of buff, the brown with a "watered" effect, the banding and mottling more longitudinal rather than cross-barred like *argentatus*. The edgings fade rapidly to almost white (A. M. N. H., No. 95594; ♀; November 1900; Hokkaido, Shiribesi Province, Japan). HEAD AND NECK dull white, thickly streaked and obscured with clove-brown, the nape with broader streaks and a somewhat buffier tone than the adjacent back. The tail-coverts are white coarsely though obscurely barred with a "watered" brown. UNDERPARTS solidly pale clove-brown with very fine indistinct mottlings and fleckings, coarser on the throat with an almost abrupt change to white on the chin which is practically unmarked. WINGS: primaries pointed, deep clove-brown, lighter on the inner webs of the inner members, these usually being narrowly and obscurely tipped with grayish white; primary coverts and alula similar; secondaries, grayer clove-brown with grayish edgings, the inner as they run into the tertials, mottled and "watered" at their tips with paler brown and buff, greater coverts form a solid drab band, much less obviously mottled and edged than in *argentatus* but the inner coverts, as they merge into the others, resemble them in irregular barrings. Wing-lining white, feathers with white shafts, edged with brown giving a somewhat barred effect; axillars grayish brown with much darker edgings and mottlings. TAIL: rectrices rounded, deep clove-brown like the primaries, with narrow buffy white tips and basally quite white with coarse mottling and longitudinal spotting resembling the back of a snake. The pattern is much like that of *fuscus* and *dominicanus* and not the cross-barring of *argentatus*. Coverts, upper and under, are white coarsely though rather obscurely barred with "watered" brown. BILL, in skin, black slightly brownish at base of the lower mandible, regularly blacker than in *argentatus*. LEGS AND FEET, in skin, dusky yellowish brown, yellower with age. IRIS probably brown.

Birds are paler and browner than *argentatus* and next to *hyperboreus* and *leucopterus* the palest brown of any large gull, and the mottlings of the lower parts are much finer than in these species. The white chin and

the drab gray-tinged wing-band are conspicuous characters; the tail markings or spottings resemble *dominicanus* or *fuscus*.

First Winter or Non-nuptial Plumage

REFERENCE SPECIMEN.—A. M. N. H., No. 76707; October 3, 1900; Gichiga, Siberia.

Acquired by a partial postjuvenal moult in August and September.

BACK much like the juvenal but the brown of the feathers rather paler and fusing into the narrower edgings. HEAD AND NECK slightly paler and grayer than the juvenal. UNDERPARTS, throat, and breast paler, the rest mostly old. WINGS AND TAIL of the juvenal plumage retained. BILL AND OTHER SOFT PARTS similar to the juvenal.

First Nuptial Plumage

REFERENCE SPECIMEN.—A. M. N. H., No. 76759; ♂; May 7, 1901; Gichiga, Siberia.

A partial prenuptial moult in April and May renews many body feathers and, while birds become whiter, especially about the head and neck, many brown feathers grow for the third time on the back. The winter fading gives a somewhat spotted effect on the lower parts. Wings and tail of the juvenal plumage are retained. The bill is lighter at the base. Other soft parts much like the juvenal.

The effect of wear through an Arctic winter is shown by a specimen (A. M. N. H., No. 76699; ♂; May 22, 1901; Gichiga), which has bleached white except for the protected basal portions of the feathers, especially noticeable in the wings and tail, where the feathers overlap keeping fresher the under feathers. This effect is also seen in other species, some birds resembling albinos.

Second Winter or Non-nuptial Plumage

Figures 170 to 173

REFERENCE SPECIMEN.—A. M. N. H., No. 76703; ♀; October 3, 1900; Gichiga, Siberia.

Acquired by a complete postnuptial moult in August and September.

BACK AND MANTLE-AREA varying from all brown to a large admixture of plumbeous feathers, or partly brown ones, the latter with very slight edgings or mottlings. HEAD AND NECK much whiter than in first winter, the neck clouded with large indefinite pale brown spots in lines. UNDERPARTS whiter somewhat clouded with obscure bolder mottling than in first winter and with streaking on the throat. WINGS: primaries with rounded tips, blacker than in the first year, secondaries similar, conspicuously edged with grayish white; tertials, greater and lesser coverts deep brown whitish-edged like the back; primary coverts and alula like the primaries, axillars, edge of wing and lining white with dusky edgings, sometimes dusky like the

juvenal. TAIL: squarish tips to rectrices and darker than in the first winter although the area of white is larger, freckled or "peppered" (a pepper-and-salt effect) rather than mottled with brown as in the first year. There is more white ground but it is so thickly freckled that it looks darker. Some tails resemble very closely the juvenal and some the third winter. BILL AND OTHER SOFT PARTS, in skin, much like the first winter, the black area of the bill often diminished, the border blurred or fused as it joins flesh-brown base, extreme tip yellowish.

Second Nuptial Plumage

REFERENCE SPECIMENS.—A. M. N. H., No. 76700; ♀; May 22, 1901; Gichiga, Siberia; and No. 76714; ♀; May 31, 1901; Gichiga.

Acquired by a partial prenuptial moult in April and May.

MANTLE shows new dusky gray feathers among similar worn or partly brown ones. HEAD AND NECK pure white with rather narrow pale brown streaks on head and nape; dusky eye-crescent and bristles about the eye. UNDERPARTS: wear and renewal of feathers produces a barred or mottled effect on lower parts except that the new chin, throat, breast, sides and tail-coverts are white. WINGS AND TAIL of winter retained, the edges of the feathers often becoming dull white through wear. BILL AND OTHER SOFT PARTS brighter than in winter.

Third Winter or Non-nuptial Plumage

Figure 174

REFERENCE SPECIMEN.—A. M. N. H., No. 76710; ♀; October 3, 1900; Gichiga, Siberia.

Acquired by a complete postnuptial moult in August and September.

BACK AND MANTLE-AREA dusky gray, rather browner than in the adult. HEAD, nape, and sides of neck pure white with faint streakings and larger clouded spottings, especially on the nape, of pale wood-brown, the clouded effect due partly to the overlapping of white feather edges on brown central areas; eye-ring and streaks about the eye dull black. UNDERPARTS white or with suggestions here and there of faint brown clouding. WINGS: primaries black with narrow white tips, the outer with a mirror of considerable size (25–35 mm.), the fifth with banded tip, the fourth plumbeous and white; the tongues extensive though varying in extent, running far up all except the outer primary. Secondaries and tertials deep dusky gray like mantle and with broad (30–40 mm.) white tips forming a conspicuous band; they sometimes show a few smudges. There are a few smudges of brown on some of the under wing-coverts, those of the edge of wing and on the alula. The primary coverts are usually browner than the mantle and are more or less dusky along the shafts. TAIL: largely white, but smudged in varying degree with dull black subterminally and on the outer edges of the rectrices, the black becomes freckled or "fogged" as it meets the white and forms an ill-defined band or is reduced to a few irregular spots; the outer web of the outer rectrix is invariably white, the inner web often with only a dusky touch. BILL, in skin, pale yellowish buff with dusky mottlings at and beyond angle on both mandibles. LEGS AND FEET, in skin, yellowish brown.

Third Nuptial Plumage

No specimen seen.

A partial prenuptial moult not including wings or tail in April and May probably brings a white head and a clearer mantle.

Fourth Winter or Non-nuptial Plumage (Adult)

Figures 175 to 178

REFERENCE SPECIMEN.—J. D., No. 40264; ♀; February 13, 1913; Numazu, Japan.

Acquired by a complete postnuptial moult in August and September.

MANTLE dark neutral gray to slate black. HEAD AND NECK white, lightly streaked with dusky gray, sometimes white. UNDERPARTS white. WINGS: primaries black with two large mirrors, one on the outer (tenth) and one on the ninth; broad apical spots; deep gray tongues varying in extent on inner webs with a white spot just before the subapical black bands on the eighth, seventh, sixth, and fifth are reached, fusing into the mirrors on the tenth and ninth; the inner primaries, the secondaries, the tertials and the scapulars, gray like the mantle, broadly white-tipped; primary coverts like mantle; alula similar on inner webs, white on outer, wing-lining and axillars white. TAIL pure white. BILL, in skin, yellow with red spot at angle. LEGS AND FEET flesh-colored; in skin, brownish flesh. IRIS probably pale yellow.

Fourth Nuptial Plumage (Adult)

REFERENCE SPECIMEN.—A. M. N. H., No. 76768; ♀; May 7, 1901; Gichiga, Siberia.

Acquired by a partial moult in April and May. Like the winter plumage except for a completely white head. Wings and tail of winter retained.

BILL deep gamboge-yellow with whitish tip and tomia; an orange-red spot on each side of the lower mandible; angle of mouth yellowish flesh-color (Stejneger). LEGS AND FEET pinkish flesh, nails horny black with whitish tips; webs darker (S.). IRIS clear Naples-yellow or rather a yellowish cream-color; eyelids purplish gray (S.).

SUMMARY

This large gull shows its affinity to the Herring Gulls (*argentatus*) by size, bill, flesh-colored legs, and a wing-pattern of long tongues of gray with white mirrors on two primaries, but the mantle is as dark as *Larus fuscus affinis* or darker and the juvenal tail resembles the *fuscus* group, although the spots are rather more elongated and on a grayer ground. The juvenal plumage is unlike any other gull, being a paler brown with a striking drab wing-bar and a white chin sharply contrasting with the gray underparts. This species has been needlessly confused with the Atlantic *Larus marinus*, which never occurs on the Pacific

Ocean and with *Larus cachinnans* and *Larus argentatus vegæ*, both occurring within its winter range on the Japan coast. The yellow color of the legs separates adult *cachinnans* and the mantle of *vegæ* is much paler, while the characters just given for the juvenal and first winter bird are found in neither *cachinnans* nor *vegæ* both of which are smaller. I have examined the type in the United States National Museum (No. 92885; ♂; May 5, 1883; Bering Island, Kamchatka).

Larus marinus

Great Black-backed Gull

Figures 179 to 190

Larus marinus LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., I, p. 136 (southern Sweden).

? *Larus varius* BRÜNNICH, 1764, 'Orn. Bor.,' p. 45.

Larus waggellus TUNSTALL, 1771, 'Orn. Brit.,' p. 3.

Larus albus MÜLLER, 1776, 'Natursyst.,' Suppl., p. 108.

Larus maculatus BODDAERT, 1783, 'Tabl. Pl. Enl.,' p. 16.

Larus giganteus BENICKE, 1812, Ann. Wetterau Gesel., III, p. 140.

Larus maximus LEACH, 1816, 'Syst. Cat. Brit. Mus.,' p. 40.

L[arus] mülleri BREHM, 1830, Isis, p. 993.

L[arus] fabricii BREHM, 1830, Isis, p. 993.

Larus nigripallus DUBOIS, 1860, 'Pl. Col. Ois.,' Belg., III, p. 240.

Larus marinus vulgaris BREHM, A. E., 1866, 'Verz. Samml.,' p. 14.

DISTRIBUTION

Breeding range, the Atlantic coast of North America from Nova Scotia to Labrador, the west coast of Greenland to Upernavik (Lat. 73° N.), Iceland, the northern British Isles and islands off their coasts, Scandinavia, and northern Russia east to the Petchora River. In winter, south casually to Florida, and Cuba, the Bermuda, Azores and Canary Islands, the Mediterranean, Black and Caspian Seas, and the west coast of Africa to Senegal.

MEASUREMENTS

	MALES (8)	FEMALES (7)
Wing	463-498 (481.0)	454-491 (465.8)
Tail	183-211 (198.4)	181-209 (189.4)
Tarsus	72- 85 (79.8)	74- 81 (75.7)
Toe without claw	60- 69 (64.4)	59- 65 (61.7)
Culmen	57- 72 (64.8)	57- 66 (60.7)
Bill at base	21- 25 (23.4)	21- 24 (22.3)
Bill at angle	22- 27 (25.0)	22- 27 (24.0)

MOULTS AND PLUMAGES

Natal Down

REFERENCE SPECIMENS.—C. H. Townsend, No. 1401; ♂; July 5, 1915; Natashquan, Labrador. L. B. B., No. 6632; July 21, 1901; Kegaskka, Labrador.

BACK, WINGS, SIDES, AND FLANKS buffy grayish white, coarsely lined and spotted with blurred clove-brown or black. HEAD slightly whiter with clearer blacker spots. UNDERPARTS much paler, buffy white on breast, obscurely spotted on posterior parts and on sides of chin. BILL, in skin, dusky basally with flesh-brown tip. LEGS AND FEET, in skin, brownish black. IRIS probably dark brown.

Much like *argentatus*, but with rather darker spotting and the tarsus dusky. A specimen (A. M. N. H., No. 29893; ♂; September 24, 1884; Cape Whittle, Labrador) is so nearly in juvenal plumage that only grayish down with brown spots remains about the head; browner down at tips of throat feathers, thighs, flanks, lower back and anal region; and whiter on under surface of wings.

Juvenal Plumage

Figures 179, 180 and 190

REFERENCE SPECIMEN.—J. D., No. 15832; September 18, 1891; Stromness, Scotland.

BACK AND MANTLE-AREA darker clove-brown than *argentatus* and the feathers less mottled but with very broad buff edgings that incise the feathers, sometimes nearly cutting them into bars that make the bird seem paler than other species and with bolder, larger mottlings; similar in pale brown tone to *schistisagus*, but more coarsely mottled. HEAD AND NECK much whiter, narrowly streaked, the rump white, slightly less barred; dusky eye-crescent; forehead and lores white narrowly streaked. UNDERPARTS decidedly white, the throat lightly streaked or spotted, the breast and abdomen and sides more or less streaked or spotted inconspicuously. WINGS: primaries dull brownish black, pointed, and narrowly tipped with pale buff; from the seventh inwards noticeably paler on inner webs, the fourth to first with shadowy pale brownish tongues; primary coverts similar; greater coverts mottled like *argentatus*, not brown like *schistisagus*; wing-lining and axillars largely white barred with brown. TAIL largely white with a curious marbling of zigzag bars and elongated spots, the central rectrices quite solidly black, diminishing to subterminal bars on the very white outer pairs. It is broadly tipped with white (unlike *argentatus* or *schistisagus*). BILL brownish black, basally pinkish, tip pale horn-color (Witherby); in skin, black, brownish at extreme base of mandible. LEGS AND FEET livid bluish flesh-color, webs pinker (W.); in skin, brownish flesh. IRIS dark olive-brown, eyelids yellowish brown (W.).

Resembles *schistisagus* in brown tone but the tail boldly scrawled with black is diagnostic; the rump is whiter than in any of the large species.

First Winter or Non-nuptial Plumage

REFERENCE SPECIMENS.—J. D., No. 7303; ♂; January 9, 1900; Cape Hatteras, North Carolina. J. D., No. 45751; February 3, 1897; Long Island, New York; a worn bird.

Acquired by a partial postjuvenal moult in August and September, or later.

BACK a grayer brown than in the juvenal plumage, less mottled and with the buff edgings fusing into the brown. HEAD AND NECK whiter than in the juvenal.

UNDERPARTS much whiter, on chin, throat and breast than the juvenal. WINGS AND TAIL of juvenal plumage retained. BILL AND OTHER SOFT PARTS like the juvenal (see 'Brit. Birds,' 1914, p. 306).

First Nuptial Plumage

No specimen examined.

Acquired doubtless by a partial prenuptial moult in March and April.

Plumage probably much like first winter, a few dark feathers may come on the back and the head becomes very white. Wings and tail of juvenal plumage retained. Bill and other soft parts much like the winter.

Second Winter or Non-nuptial Plumage

Figures 181 and 182

REFERENCE SPECIMENS.—J. D., No. 4723; ♂; November 9, 1897; Montauk Point, New York. A. M. N. H., No. 123785; September 1, 1909; Magdalen Islands, Gulf of St. Lawrence; outer primaries not grown.

Acquired by a complete postnuptial moult in July, August and September, some European specimens beginning the moult as early as the end of May.

BACK AND MANTLE-AREA paler brown than in first winter and more "watered" effect in the mottling, the brown area of each feather has diminished to a basal somewhat freckled portion, then a dusky "watered" band, then a wide grayish wood-brown area, then a narrow clove-brown band and finally a terminal narrower one of grayish buff; tail coverts white, scantily barred. HEAD white with narrow indistinct streaking, the neck broadly striped, the brown veiled with the white edgings of more or less imperfectly barred feathers; eye-crescent dusky with pencillings about the eye. UNDERPARTS almost entirely white save for obscure streakings on sides of throat, sides, flanks, and a few inconspicuous bars on the tail-coverts. WINGS: primaries much like the first winter, but rounded at the tips, the distal occasionally with a suggestion of a mirror, the outer surface of the wing is rather more finely mottled or freckled than in the first winter, as well as the secondaries and tertials; under wing-coverts and axillars like the first winter. TAIL similar to the first winter, sometimes indistinguishable, but mottlings usually much finer and more freckled and with smaller spots and markings. BILL and other soft parts much like the first winter. In skin, the bill is black with a broad ill-defined subterminal black band and a yellowish tip; the eyelids yellowish brown (Witherby).

Second Nuptial Plumage

REFERENCE SPECIMEN.—J. D., No. 2107; ♂; February 4, 1884; Long Island, New York; beginning the moult.

Acquired by a partial prenuptial moult, not including the wings or tail, in March and April. Whiter, with less streaking about the head; mantle with some fresh slaty black; bill with only an imperfect black band just in front of angle; eyelids yellowish to dull orange (Witherby).

Third Winter or Non-nuptial Plumage

Figures 183 and 184

REFERENCE SPECIMEN.—A. M. N. H., No. 35762; February 12, 1887; Eastport, Maine.

Acquired by a complete postnuptial moult in August and September.

MANTLE slaty black, the feathers with grayer edges, browner on wings, and occasional freckling in some specimens, especially on tertials and greater coverts; tail-coverts white. HEAD AND NECK white with veiled linear brown spots chiefly on the nape; eye-crescent and hair lines about the eye black. UNDERPARTS snowy white, sometimes flecked faintly on sides of throat. WINGS: primaries black with white apices, the outer with a large mirror (about 45–60 mm.) separated from tip by a black band or half band; the mirror is blurred on its edges and the shaft through it is usually dusky; the ninth primary may have no mirror or one that varies from a mere white dot on inner web to a 20 mm. mirror covering both webs; primary coverts browner than the primaries and with white tips more or less blurred or freckled with brown. The seventh or sixth primary begins to show pale brown tongues terminating in nearly white areas on the inner webs, the fifth primary usually with a subterminal band, the fourth to first, like the secondaries, and tertials, slaty with broad white tips; wing-lining and axillars mostly white with brown edgings. TAIL largely white, the central rectrices (and often the outer) vermiculated or freckled with brownish black. Entirely white rectrices are sometimes found but more frequently one half of each feather is white or this half sprinkled with a few dots on its edge, usually the outer, the amount of sprinkling varying greatly. BILL base and tip yellowish white more or less blackish in middle with varying amounts of orange at angle (Witherby); in skin, yellowish or brownish flesh with dull black band with fused edges beyond nostril and at angle, the tip yellowish, and often beginnings of a red spot. LEGS AND FEET flesh-colored or whitish (W.); in skin, flesh-brown. IRIS dark or gray-brown, sometimes buffish yellow; eyelids yellow to dull orange (W.).

Third Nuptial Plumage

REFERENCE SPECIMEN.—A. M. N. H., No. 29896; ♂; May 26, 1884; Betchoine, Labrador.

Acquired by a partial prenuptial moult in March and April. Differs from the third-winter in pure white head and neck and clearer mantle. Bill and eyelids get a little more color, the latter especially redder ('Brit. Birds,' 1914, p. 306). Wings and tail of winter retained.

Fourth Winter or Non-nuptial Plumage (Adult)

Figures 185 to 189

REFERENCE SPECIMENS.—A. M. N. H., No. 74210; ♀; January 12, 1900; Hatteras, North Carolina. J. D., No. 50882; ♀; September 27, 1909; Bridgewater, Somersetshire, England; first primary not full-grown.

Acquired by a complete postnuptial moult in August and September.

MANTLE slaty to sooty black. HEAD AND NECK white, or lightly streaked with dusky brown. UNDERPARTS snowy white. WINGS: the outer primary usually has a

white tip for about 70 mm. (sometimes crossed with a black bar), the second with a large mirror which often joins with the white tip if the subterminal black bar is imperfect; secondaries and tertials gray like mantle broadly white-edged. TAIL pure white. BILL "bluish-horn to yellow at tip, lower mandible with bright orange spot, narrow dark band" (*ex* label). LEGS AND FEET "flesh-color" (*ex* label). IRIS "yellow, brown-tinged" (*ex* label).

As in other species, especially the dark-mantled, the streaking of the head and neck diminishes with age. Some birds, at least, have pure white heads in the fourth winter, but not all; and some have traces of a dusky band on bill.

Fourth Nuptial Plumage (Adult)

REFERENCE SPECIMENS.—J. D., No. 15930; ♂; May 27, 1901; Goteborg, Sweden. A. M. N. H., No. 29891; ♂; June 17, 1884; Cape Whittle, Labrador.

Acquired by a partial prenuptial moult in March and April.

Like the winter plumage except for the white head; wings and tail of winter retained. BILL pale yellow, spot and gape bright vermilion, tip whitish bone-color, sometimes a small dusky spot near tip of lower mandible (Witherby); in skin, yellow with red spot. LEGS AND FEET flesh-color or whitish (W.); in skin, brownish flesh. IRIS very pale lemon; eyelids vermilion (W.).

SUMMARY

A North Atlantic subarctic species. The large yellow bill with a red spot the flesh-colored legs and feet and the wing-pattern show its affinity with the Herring Gulls, although the mantle is nearly black. The juvenal plumage is diagnostic and unlike any other gull for none have the vermiculated tail-pattern on a ground largely white nor in any is the mantle-area so very pale and with such broad white edgings. The European and the American bird do not differ appreciably. It is one of the largest of the gulls and has a strikingly black back or "saddle." On account of its size it might be expected that a considerable number of specimens would fail to obtain the fully white tail at the third postnuptial moult but, as the tail is very white even in the juvenal plumage, the advance to maturity is seemingly quite as fast as in smaller, dark-tailed species. According to Mathews (1923, p. 78), Selby in 1840 fixed *Larus marinus* as the type of the genus. It is to be hoped it will stay fixed, for both *canus* and *hyperboreus* have already been assigned to this honor by the systematists. *Larus marinus* is certainly more typical than either of the other two species

Larus glaucescens

Glaucous-winged Gull

Plate XIII; Figures 191 to 202

Larus glaucopterus KITTLITZ, 1836, in Lutke's 'Voy. Séniavine,' (French transl.), III, p. 272.

Larus glaucescens NAUMANN, 1840, 'Vög. Deutschl.,' X, p. 351 (North America).

Larus chalconotus LAWRENCE, 1858, 'Rep. Pac. R. R. Surv.,' IX, p. 843.

? *Larus fuscus* PELZELN, 1873, Verh. Zool. Bot. Ges. Wien, XXII, p. 160.

? *Larus borealis* TACZANOWSKI, 1882, Bull. Soc. Zool. France, p. 397.

DISTRIBUTION

The breeding range includes the western coast of North America from Washington to Norton Sound, Alaska, the Aleutian and other islands of Bering Sea and northeastern Siberia from Kamchatka northward. The winter range on the American coast extends south to California; accidental as far as Guadalupe Island and on the Asiatic coast northern Japan is reached.

MEASUREMENTS

	MALES (14)	FEMALES (11)
Wing	394-445 (422.6)	385-412 (400.5)
Tail	161-187 (177.7)	165-176 (171.1)
Tarsus	65- 76 (69.1)	62- 69 (64.6)
Toe without claw	55- 64 (59.3)	52- 59 (54.8)
Culmen	53- 64 (57.6)	49- 55 (51.6)
Bill at base	17- 21 (19.7)	17- 19 (17.8)
Bill at angle	18- 22 (20.6)	18- 20 (18.6)

MOULTS AND PLUMAGES

Natal Down

REFERENCE SPECIMENS.—A. M. N. H., No. 67841; June; Sitka, Alaska. A. M. N. H. No. 90660; July 11, 1903; Seldovia, Alaska.

BACK AND WINGS grayish buff often with marked yellowish tinge, lined and blotched very irregularly with clove-brown. HEAD paler, with inky black spotting, large and small. UNDERPARTS paler and buffier, grayish shading basally on throat and chin, the latter together with upper throat having large black irregular spots, the anal region and crissum obscurely blotched or mottled. BILL, in skin, blackish with terminal third buffy flesh. LEGS AND FEET, in skin, black. IRIS probably dark brown.

The buff fades rapidly to grayish white. A specimen (A. M. N. H., No. 90666; ♂; July 24, 1903; Seldovia, Alaska) is nearly out of the down with wings and tail about one-third grown, and body plumage well developed except on the sides of the crown, the nape, the throat, the rump, the crissum, and the thighs where down predominates.

Juvenal Plumage

Figures 191 and 192

REFERENCE SPECIMEN.—A. M. N. H., No. 76201; ♀; August 25, 1901; Homer, Alaska.

BACK AND MANTLE-AREA grayish hair-brown to light mouse-gray with light buff edgings, the feathers obscurely mottled or incised, the scapulars partly barred subterminally; rump and upper tail-coverts slightly paler, barred. HEAD darker gray, paler anteriorly, indistinctly but heavily and solidly streaked, the feathers dark centrally or with buffy or whitish edgings and tips, the neck basally white broadly striped or clouded and the edgings faint. Head darker than the back because it is more solid in color, grayer on forehead and lores; eye-ring gray, eye-crescent dusky and inconspicuous. UNDERPARTS mouse-gray, with obscure barring of the feathers that becomes more prominent with wear; chin, upper throat, anal region and crissum white, the chin usually faintly flecked, the throat streaked and the crissum boldly barred. WINGS: primaries pointed, mouse-gray to light drab, darker and brownish on the outer webs, a little dusky subterminal mottling and narrow indistinct whitish tips except on the two or three outer quills; primary coverts similar; secondaries paler gray with whiter inconspicuous tips, the inner with some mottling on their edges; tertiaries more mottled terminally and like back; median coverts darker than the secondaries, finely mottled or partly barred especially the inner members of the series; other coverts more coarsely mottled and conspicuously buffy like the back, the marginals more solid in color, and sometimes without edgings or with narrow ones; wing-lining drab, whitish basally and along the shafts; axillars plain mouse-gray; border of wing paler. TAIL solidly mouse-gray, sometimes darker, usually inconspicuously barred or mottled basally, especially the outer pair. There may be also a few jagged buff spots, usually inconspicuous, on the outer web of the outer pair and the tip of the tail may be narrowly buff or with a little obscure terminal mottling. BILL (see Pl. XIII, fig. 1) "black, benzo-brown base of mandible; gape buff or white" (Bishop); similar in skin, the black brownish. LEGS AND FEET (see Pl. XIII, fig. 1) "light cinnamon or vinaceous drab" (B.); in skin, dull brown. IRIS (see Pl. XIII, fig. 1) "Prout's brown or auburn; eyelids black or brownish" (B.).

First Winter or Non-nuptial Plumage

REFERENCE SPECIMENS.—J. D., No. 40859; ♀; October 21, 1913; Victoria, British Columbia. J. D., No. 40103; ♂; February 9, 1914; Pacific Grove, California.

Acquired by a partial postjuvenal moult in August, September, and October.

BACK a gray hair-brown with finer more indistinct mottling than in juvenal plumage; rump and tail-coverts barred, partly new. HEAD AND NECK whiter than in juvenal, the streaking more obvious, becoming clouded or blurred on the neck where the feathers have whiter, broader edgings. UNDERPARTS, chin, throat and breast whiter than the juvenal, clouded and flecked with drab; posterior portions chiefly gray fading to brown. WINGS AND TAIL of the juvenal plumage retained becoming with wear much paler and whitish edged. BILL AND OTHER SOFT PARTS like the juvenal.

First Nuptial Plumage

REFERENCE SPECIMEN.—A. M. N. H., No. 90667; ♂; July 12, 1903; Seldovia, Alaska. At the very end of this plumage, the second winter partly assumed and evidently a backward bird. The postnuptial moult has advanced till only four old primaries are left, the rest being new; also the tertials and median coverts and all of the new feathers are dark like the first-winter. The old are worn threadbare and bleached white where exposed on the edges, the old tail a pale brown but the primaries and some of the wing-coverts faded to white.

Acquired by a partial prenuptial moult, not including the wings or tail, in March and April.

Differs little from the first winter except that the new feathers of back, head, throat and breast though paler than the winter seem very dark in contrast to those which have faded to white, sometimes including even the wings and tail; the mottlings are diminished; a few gray feathers may sometimes appear on the back; head and throat quite white. The bill and other soft parts much like the winter, the bill with a larger pale brown area at the base.

Second Winter or Non-nuptial Plumage

Figures 193 to 195

REFERENCE SPECIMEN.—J. D., No. 40104; ♀; February 18, 1914; Pacific Grove, California.

Acquired by a complete postnuptial moult in August and September.

BACK AND MANTLE-AREA usually with more or less of the adult gray, more often mixed with drab, the mottling finer; rump and upper tail-coverts largely white or faintly barred. HEAD AND NECK much whiter and more distinctly streaked than in the first winter, the nape boldly striped or blotched. UNDERPARTS much like the first winter, but much whiter on breast and throat, the chin white, indistinctly streaked or spotted; under tail-coverts irregularly barred. WINGS: primaries and secondaries drab like the first winter, rarely with a suggestion of a mirror on the outer; coverts more finely freckled than in the first winter; wing-lining and axillars drab obscurely mottled. TAIL solid drab or hair-brown or with slight freckling basally on outer two pairs, the outer web of the outer pair edged with dull white or sometimes more or less freckled. BILL "blackish brown, merging into drab and buff at base" (Bishop); in skin, dull black at angle and beyond nostril, brownish flesh basally, less on maxilla. Other soft parts much like first winter.

Second Nuptial Plumage

REFERENCE SPECIMENS.—J. D., No. 52499; ♀; May 25, 1920; Queen Charlotte Islands, British Columbia. J. D., No. 24394; ♀; April 16, 1893; Point Fermin, California.

Acquired by a partial prenuptial moult, not including the wings or tail in March and April.

The clear gray of the back becomes more extensive, the head and neck whiter, the streakings more fused or blotched, the throat somewhat barred, the breast almost pure white, chin, sides and crissum white, leaving a dingy drab area of old worn feathers on mid-abdomen. BILL "clove-brown before and at angle and beyond nostrils, gape ecru-drab" (Bishop). LEGS AND FEET "ecru-drab" (B.). IRIS "broccoli or Vandyke brown; eyelids black" (B.).

Third Winter or Non-nuptial Plumage

Figure 196

REFERENCE SPECIMEN.—J. D., No. 51959; ♀; January 11, 1920; Comox, Vancouver Island, British Columbia.

Acquired by a complete postnuptial moult in August and September.

BACK AND MANTLE-AREA gray, often with a brown tinge on greater and lesser coverts, the median row more mature and grayer. HEAD AND NECK white, heavily clouded, spotted or blotched. UNDERPARTS white, the breast and throat spotted or partly barred, the mid-abdomen more or less smudged with drab as a rule. WINGS: primaries dark drab-gray with white tips and a large mirror on first; tongues show more or less on all except the first, the outer web of this quill usually being browner or paler than the others; the tongues pass to the outer webs at the third or fourth reducing the gray to a subterminal band on the sixth, the rest are all gray with broad white tips. Less advanced birds have browner primaries, less white tipping, less decided pattern on the tongues and the mirrors less clearly developed; there may be no white tips and no mirror. TAIL largely white, the inner rectrices more or less smudged or freckled with drab-gray chiefly on inner webs with a touch on the outer webs. Backward birds have tails largely gray, mottled and freckled on the outer webs, and no white tips to the primaries (J. D., No. 52498; ♀; May 16, 1920; Queen Charlotte Islands, British Columbia). BILL "pale chrome-yellow tinged with green, blotch scarlet-orange, blackish marks; gape and mouth whitish" (*ex* label); "pinkish white" (Bishop); in skin, yellow with dusky clouding near tip and red spot poorly developed. LEGS AND FEET pinkish (*ex* label); "pinkish white" (B.); in skin, yellowish brown. IRIS "freckled pale brownish gray" (*ex* label); "raw umber or maize-yellow" (B.); "eyelids purplish pink" (*ex* label); "orange" (B.).

Third Nuptial Plumage

REFERENCE SPECIMEN.—L. B. B., No. 31733; ♀; March 28, 1919; Los Angeles County, California.

Acquired by a partial prenuptial moult in March and April; wings and tail of winter retained. Like the winter except that the head and neck become pure white and streakings are lost. Bill and other soft parts brighter than in winter.

Fourth Winter or Non-nuptial Plumage (Adult)

Figures 197 to 202

REFERENCE SPECIMEN.—J. D., No. 51960; ♂; January 12, 1920; Comox, Vancouver Island, British Columbia.

Acquired by a complete postnuptial moult in fall.

MANTLE neutral gray. HEAD AND NECK white with dusky clouding and streaking. UNDERPARTS white, obscure dusky barring or spotting across throat. WINGS: primaries and shafts a gray-drab, paler on inner webs, dark toward tips which have apical white spots, the tenth with mirror that is variable, rarely tip wholly white, ninth with or without mirror, the seventh, sixth and fifth banded subterminally, fourth to first all gray white-tipped, fifth, sixth and seventh with gray tongues on both webs; secondaries, tertials and scapulars gray, broadly white-tipped. BILL "pale pea-green washed with yellowish, chrome or sulphur-yellow" (Bishop). LEGS AND FEET "pinkish white" (B.). IRIS, "baryta or straw-yellow; eyelids fawn or vinaceous" (B.).

Fourth Nuptial Plumage (Adult)

REFERENCE SPECIMEN.—J. D., No. 52801; ♂; May 26, 1920; Queen Charlotte Islands, British Columbia.

Acquired by a partial prenuptial moult, not including wings or tail, in April and May, a white head and neck being assumed. Bill and other soft parts brighter than the winter (see Pl. XIII, fig. 2).

SUMMARY

The affinity of this gull to the *argentatus* group is shown by size, the yellow bill with red spot, similar wing and tail-pattern and flesh-colored legs. It is a Herring Gull with the color washed out of wings and tail producing a decidedly drab-gray appearance. The tongues of the primaries tend to push into the mirrors just as they do in *Larus argentatus thayeri* but the outer mirror seldom includes the tip. The mantle is neutral gray in shade like *vegæ*. In juvenal plumage the drab-gray wings and tail distinguish it from every other gull although occasionally there are birds so dark they may be mistaken for the occasional paler examples of *Larus argentatus thayeri*, *Larus californicus* or *Larus occidentalis*. The solid gray-colored tail with few markings, the uniform wing-bar almost devoid of mottlings and the size, especially obvious in the large bill and feet, are characters that help to determine doubtful cases.

Asiatic and far northern specimens average a trifle larger, but there is so great variation in the size of birds from any breeding locality that I do not believe this slight variation deserves more than passing mention.

Larus hyperboreus

Glaucous Gull

Figures 203 to 210

Larus glaucus BRÜNNICH, 1764, 'Orn. Bor.,' p. 44.

Larus hyperboreus GUNNERUS, 1767, in Leem's 'Beskr. Finn. Lapper.,' p. 226, footnote (northern Norway).

Larus giganteus BENICKEN, 1812, Ann. Wetterau, Ges., III, p. 140.

Larus maximus O'REILLY, 1818, 'Greenl.,' p. 141.

Larus leucereetes SCHLEEP, 1819, N. Ann. Wetterau Ges., IV, p. 314.

Larus consul BOIE, 1819, Wiedemann's Zool. Mag., p. 126.

Larus medius, BREHM, 1822, 'Beitr. Vogelk.,' III, p. 810.

Larus islandicus EDMONSTON, 1822, Mem. Wern. Soc., IV, p. 185.

Larus glacialis BREHM, 1824, 'Lehrb. Eur. Vög.,' p. 705.

Larus minor BREHM, 1830, Isis, p. 993.

Larus hutchinsii RICHARDSON, 1832, in Swains. and Rich., 'Faun. Bor.-Am.,' II, p. 419.

? *Larus nelsoni* HENSHAW, 1884, Auk, I, p. 250.

Larus barrovianus RIDGWAY, 1886, Auk, III, p. 330.

Larus glaucescens TACZANOWSKI, 1893, Mem. Acad. St. Petersburg., (7) XXXIX, p. 1019.

DISTRIBUTION

Circumpolar breeding range, largely north of the Arctic Circle (Siberia, Spitzbergen, Bear Island, Iceland), but in North America south to the Alaskan Peninsula, Hudson's Bay, and Labrador; in winter south to the British Isles, the Baltic Sea, the coasts of Japan, the Pacific coast of America sometimes to California, the Great Lakes, and the New England coast; occasionally reaching the Azores and Madeira, the Mediterranean, Black, Caspian and Red Seas, the Hawaiian Islands, Texas, Cuba and the Bermuda Islands.

MEASUREMENTS

	MALES (11)	FEMALES (10)
Wing	435-477 (459.1)	430-450 (439.0)
Tail	180-210 (196.6)	182-200 (188.1)
Tarsus	69- 77 (72.6)	64- 73 (68.1)
Toe without claw	58- 64 (60.5)	55- 61 (57.4)
Culmen	57- 67 (62.6)	56- 61 (58.3)
Bill at base	20- 24 (21.8)	18- 21 (19.6)
Bill at angle	21- 25 (22.4)	18.5-21 (19.9)

MOULTS AND PLUMAGES

Natal Down

REFERENCE SPECIMEN.—J. D., No. 27765; July 9, 1909; Koliuchin Bay, Siberia.

BACK AND WINGS pale grayish or buffy white or drab very faintly clouded or marked with pale clove-brown. HEAD rather whiter and more conspicuously marked with darker spots of dull black, larger on the occiput and sides of head, and very large on nape. UNDERPARTS grayish white, unmarked except for big spots on the gular region, the breast white. BILL, in skin, brownish black, paler at base, terminal third whitish flesh. LEGS AND FEET, in skin, yellowish brown. IRIS probably dark brown.

One of the palest of the heavily spotted group (see p. 97), paler and grayer than *argentatus*.

Juvenal Plumage

Figures 203 to 205

REFERENCE SPECIMENS.—J. D., No. 14163; ♂; September 21, 1898; Holstenborg, Greenland. A. M. N. H., No. 76697; ♀; September 21, 1900, Gichiga, Siberia.

BACK AND MANTLE-AREA pale buff mottled with pale grayish clove-brown, the feathers grayish basally becoming deeper buff at tips and edges with irregular incomplete bars that have a "watered" effect on their edges; upper tail-coverts heavily barred. HEAD grayish, or buffy white, thickly though rather inconspicuously streaked with very pale clove-brown, coarser with clouding and buff edgings on the nape, lores flecked and sharper streaks below the eye, the anterior segment of the eye-region dusky with hair-like tips to the feathers forming the eye-crescent. UNDERPARTS pale drab, obscurely mottled or barred, the feathers pure white basally, edged and tipped with pale buff and with drab bars that are irregular and broken up; chin and adjacent throat white. WINGS: the primaries are usually pale drab or dark gray with straw-colored shafts and somewhat mottled, freckled or "watered" tips, the extreme tips, buff-white, but they may be nearly white especially the outer (tenth); the extreme tips of the inner are usually buffy white, the inner webs much paler, inner primaries sometimes flecked or freckled; primary coverts and alula similar but darker and buff-tipped; secondaries grayish drab somewhat obscurely mottled on outer edges and tips; tertials more boldly mottled; greater coverts a darker grayish drab, edgings of buff and mottlings conspicuous; rest of coverts with much buffier edgings and darker mottlings like the back; wing-lining and axillars like adjacent body, drab with mottling; edge of wing whiter; alula darker than primary coverts, less speckled. TAIL peculiarly marbled with irregular mostly large white spots and longitudinal areas of pale brownish drab-gray and an irregular pale subterminal buffy band; some tails are more solidly drab and others more spotted or barred; under coverts are heavily barred. BILL "basally white washed with pale pink, terminal third blackish brown; gape pinkish white" (Bishop); in skin, basally pale brownish yellow blending into dull black beyond the nostrils. LEGS AND FEET "white washed with pale pink" (B.); in skin, dull yellowish brown. IRIS "auburn; eyelids wood-brown" (B.).

The pale drab color of the wings and tail separate the juvenal birds of this species from all the black-primaried gulls and its size separates it from *leucopterus* and *glaucescens*, the latter being much darker throughout, and with fewer markings on the tail.

First Winter or Non-nuptial Plumage

REFERENCE SPECIMENS.—J. D., No. 50879; ♀; November 19, 1908; Sukkertoppen, Greenland. A. M. N. H., No. 95338; February 20, 1899; Hokkaido, Japan; worn.

Acquired by a partial postjuvenal moult in August and September.

BACK much like the juvenal, but the mottlings somewhat more suffused giving a whiter effect. HEAD AND NECK slightly whiter than the juvenal. UNDERPARTS whiter on the chin, throat and breast. WINGS AND TAIL of juvenal plumage retained. BILL AND OTHER SOFT PARTS like the juvenal.

First Nuptial Plumage

REFERENCE SPECIMEN.—J. D., No. 23155; ♂; April 6, 1908; Julianehaab, Greenland.

Acquired by a partial prenuptial moult in April and May.

New feathers of head, throat, and breast little different from the first winter although averaging whiter. Wings and tail of the juvenal plumage are retained and fade a great deal, the primaries, secondaries and exposed edges of all wing-feathers becoming in many cases quite white. Bill and other soft parts much like the juvenal.

Second Winter or Non-nuptial Plumage

Figures 206 and 207

REFERENCE SPECIMENS.—J. D., No. 8292; ♀; September 5, 1897; Point Barrow, Alaska. J. D., No. 4803; ♂; March 4, 1891; Portland, Maine, worn and faded.

Acquired by a complete postnuptial moult in August and September.

BACK AND MANTLE-AREA much whiter than the first winter, sometimes wholly white or partly pale pinkish buff usually with mottlings or frecklings; rump rather obscurely barred. HEAD AND NECK largely white, the streakings few and obscure. UNDERPARTS much whiter than in first winter, sometimes a little pinkish buff or brown mottling or clouding on the feathers, especially on the mid-abdomen. WINGS: primaries rounded and whiter or pinker than in the first winter, varying from pinkish drab to pure white, the tenth always white on both webs, the others pale drab often nearly white, darkest on the outer web, the proximal quills somewhat freckled; primary coverts drab; secondaries pale grayish drab or white usually somewhat freckled; greater and other coverts similar; alula, axillars and wing-lining largely white or pale grayish drab with more or less obscure freckling and mottling. The wings quickly fade to white. TAIL white, usually finely freckled or inconspicuously mottled with drab. BILL AND OTHER SOFT PARTS much like first winter, the black band of the bill fainter.

It is evident that the average bird gets a good deal of white in its plumage at the first postnuptial moult, many get feathers with a pinkish tinge, and some get a little gray in the mantle. In fact, all three sorts of feathers may be found side by side on the backs of some specimens, but the average bird seems to be nearly white with little or no gray anywhere.

A small number become entirely white and these birds were once supposed to represent a species and were named "*hutchinsii*." Few of them, however, fail to show evidences of immaturity in obscure specklings of tail or body, and the bill is always dusky at the tip. It is possible that some of the so-called "*hutchinsii*" are backward third year birds as well, but it is certain that most of them are only extremes in a variable second year plumage that grades in an unbroken series from gray or pinkish birds to those that are pure white. Extreme fading may obliterate

ate some of the speckling but it cannot fade all first year birds of ordinary *hyperboreus* into "*hutchinsii*" as has been suggested.

Second Nuptial Plumage

REFERENCE SPECIMEN.—A. M. N. H., No. 64647; ♀, March 11, 1884; Long Island, New York; new gray mantle appearing among nearly white old feathers.

Acquired by a partial prenuptial moult in April and May; wings and tail of second winter plumage retained. New feathers of head, neck, throat, breast and back differ little from the second winter, the gray mantle more obvious. Bill, eyelids, and iris begin to show some color like the adult.

Third Winter or Non-nuptial Plumage

Figure 208

REFERENCE SPECIMENS.—J. D., No. 8288; ♀; August 27, 1897; and J. D., No. 8289; ♀; September 5, 1897; Point Barrow, Alaska.

Acquired by a complete postnuptial moult in August and September.

MANTLE largely pallid neutral gray, sometimes with brown tint, especially on the outer surface of the wings where there are usually faint brownish frecklings; also on rump. HEAD AND NECK white, the nape with slight pinkish drab streaking on the neck, or with occasional clouding; inconspicuous dusky eye-crescent. UNDERPARTS white, with some drab clouding, varying in amount, especially on abdomen, the under tail-coverts somewhat obscurely barred. WINGS: primaries white or faintly drab on outer webs, sometimes gray basally; primary coverts similar, seldom flecked; alula more flecked; secondaries white or gray-tinged, tipped with white; tertials white or gray-tinged faintly mottled or freckled chiefly terminally and on outer webs; greater coverts white or gray, drab-tinged, the inner obscurely freckled or barred, median and lesser gray or drab; axillars white, lining and edge of wing white or very slightly edged with drab. TAIL white with variable amount of terminal freckling or smudging, the base white. BILL, in skin, yellowish flesh-brown with a subterminal clouded or broken dusky band in most cases. Other soft parts much like the adult.

Third Nuptial Plumage

REFERENCE SPECIMEN.—J. D., No. 24383; ♀; April 25, 1906; Sukkertoppen, Greenland.

Acquired by a partial prenuptial moult not including the wings or tail, in March, April and May. Differs little from the winter, but the bill and other soft parts with more color.

Fourth Winter or Non-nuptial Plumage (Adult)

Figures 209 and 210

REFERENCE SPECIMENS.—J. D., No. 3885; ♂; February 22, 1895; Sable Island, Nova Scotia.

Acquired by a complete postnuptial moult in August and September.

MANTLE pallid neutral gray. HEAD, NECK, UNDERPARTS, AND TAIL pure white. WINGS: primaries white terminally for 25–50 mm. blending gradually with the gray of the mantle; secondaries gray, broadly white-tipped forming a wing-band; wing-lining and axillars white. BILL, in skin, yellow with red spot or area at angle. LEGS AND FEET, in skin, pale yellowish flesh-brown. IRIS very pale lemon, eyelids vermillion (Witherby).

Fourth Nuptial Plumage (Adult)

REFERENCE SPECIMENS.—A. M. N. H., No. 156605; ♂; June 10, 1915; Etah, Greenland. J. D., No. 8285; ♂; June 17, 1898; Point Barrow, Alaska. A. M. N. H., No. 64142; August 2, 1893; Greenland (west coast).

Acquired by a partial prenuptial moult in April and May. Plumage like the winter, the wings and tail being retained.

BILL in "adult as in Herring Gull and other stages apparently as in Herring Gull, but orbital ring in adult vermillion" [in *argentatus*, orange-yellow] (Witherby). Other soft parts rather brighter colored. An early description of the "Burgermeister" (Martens, 'Voyage to Spitzbergen') says "his under-bill is somewhat rising or knobby at the point or end, a great deal more than the *kutge-gehefs* (= "Stercorarius parasiticus") which looketh very pretty as if he had a cherry in his mouth."

SUMMARY

This is one of the largest of the gulls. Because of size, the shape and color of the bill and the streaking of head and neck in winter it is evidently a fairly close relation of the *argentatus* group although white primaries, that basally shade into the very pale gray mantle, take the place of the patterned primaries of *argentatus*. The juvenal plumage, too, is quite different from this group, the primaries being a pale drab with straw-colored shafts and the tail peculiarly marbled just as if the pigmented areas of *argentatus* were being diluted or "watered" by an infusion of white. In the second year a farther infusion of white or rather a diminution of pigment produces in some cases the wholly white birds once named "*hutchinsii*." Such uncommon specimens often show obscure freckling in the plumage, especially the tail, and have dusky bills proving them to be second year (or some of them perhaps backward third year) birds and are not the usual second year birds that regularly show more or less of the gray mantle. The plumages of this species have already been so thoroughly discussed by me years ago (Dwight, 1906) that I can now add little of value. I doubt, however, if the percentage of birds acquiring adult plumage by the third winter is as large as I then supposed it to be. In the same article I placed on record my reasons for discarding "*Larus barrovianus*" described in 1884 (Type in U. S. N. M., No. 88913, August 4, 1882, Point Barrow, Alaska). I repeated and amplified them later (Dwight, 1919) and recent examination of still more material gives me no

cause for changing my opinion. I can find no difference between *hyperboreus* and "*barrovianus*" in the color of the mantle when equally fresh specimens are compared, and "*barrovianus*" measures only a trifle smaller (i.e., 2.5% in wing, 3.2% in tail, 4% in tarsus, 4.5% in toe, and 7% in culmen). In my opinion, there is not sufficient reason for separation. The other side of the question has been presented by Oberholser (1918 and 1919).

The actual crossing of this pale-mantled species with the black-mantled *Larus marinus* in captivity, as recorded by Lönnberg (1919), is of the greatest interest, and it is to be hoped crossing of later generations may be observed, for the case cited is that of a hybrid that lived only one year. Apparently *hyperboreus* had only a paling influence least marked in the primaries.

It seems probable that so-called "*Larus nelsoni*" (Type in U. S. Nat. Mus. No. 97253, ♂, June 20, 1880, St. Michaels Alaska) is a hybrid resting on a footing similar to "*Larus kumlieni*," which is discussed elsewhere under *Larus argentatus* (p. 195). Lönnberg shows that hybridization has been effected at the Zoölogical Gardens both in Copenhagen and Stockholm between *Larus marinus* and *Larus hyperboreus*, and between *Larus fuscus* and *Larus leucopterus*. In the first case the hybrids were observed only during their first year, in the other during three years. The outstanding fact is that the blackness of the wing-pattern of the dark male parents, *marinus* and *fuscus*, was dominant while the whiteness of *hyperboreus* and *leucopterus* appeared only in the paler tone of first year birds, and the pale mantle and wing-pattern of later years.

There is reason for supposing that "*Larus nelsoni*" and "*Larus kumlieni*" are both hybrids because they show the characters of both parents, because no two of the specimens are alike, and because they occur where interbreeding is possible. The four or five known specimens of "*Larus nelsoni*" are chiefly in the plumage of *hyperboreus* with touches of grayish or dusky pattern on the outer primaries that might well be derived from the black of *L. argentatus vegæ* reduced to the smudges that we find. Measurements do not throw much light on the question, for these specimens are so near the size of *hyperboreus*; but, on the other hand, they might very well fit the dimensions of the larger specimens or of *argentatus vegæ*. I have also examined the specimen of "*nelsoni*" recorded from the Hawaiian Islands (1918, Auk, XXXV, p. 349) and consider it merely *glaucescens* in faded first winter plumage. It can be matched in every respect by other first winter birds although the juvenal plumage that remains is almost unrecognizable.

The wing-pattern of the type of "*kumlieni*" is shown by Fig. 213; others by Figs. 214 and 221 to 226; the type of "*nelsoni*" by Fig. 211, another specimen by Fig. 212.

Summed up, the positive evidence that "*nelsoni*" and "*kumlieni*" are species is lacking. Negative evidence shows in the first place that specimens are extremely rare; in the second that no two of them are marked alike, but the pattern of the primaries is just what would be expected if the black color of *Larus argentatus vegæ* were diluted, withdrawn or diminished in varying degree, and finally no definite breeding areas can be assigned to either of them for, so far as we know, all come from intermediate regions where interbreeding might take place. It may be that species will be established in both cases but at present this is not proven. I have endeavored to present the facts, and from them it is possible for others to draw different conclusions, but I believe they warrant those which I have drawn. *Larus* "*kumlieni*" is probably derived through crossing of *Larus leucopterus* and *Larus argentatus thayeri*, while "*Larus nelsoni*" is a mixture of *Larus hyperboreus* and *Larus argentatus vegæ*.

The nomenclatural career of *hyperboreus* species has been a checkered one as the long list of synonyms indicates. Ridgway (1919) cites it as the type of the genus *Larus*, being so designated by Gray (1840) but recently Mathews (1823, p. 78) pointed out the fact that Selby in 1840 fixed the type as *Larus marinus* and is probably correct in this assumption.

It is, however, obvious that Gray was wrong, for *hyperboreus* cannot be the type because it was not among the original species described by Linnæus in his genus *Larus*.

Larus leucopterus

Iceland Gull

Figures 215 to 220

Larus leucopterus VIEILLOT, 1820, 'Tabl. Encyc. et Méth.,' I, p. 346 (Baffin's Bay).

Larus argentatus SABINE, 1819, Trans. Linn. Soc. London, XII, p. 546.

Larus glaucoides MEYER, 1822, 'Taschenb., Zusätze,' III, p. 197.

Larus moltke TEILMANN, 1823, 'Dan. og. Isl. Fugl.,' p. 159.

Larus islandicus EDMONSTON, 1823, Mem. Wern. Soc., IV, p. 506.

Larus arcticus MACGILLIVRAY, 1824, Mem. Wern. Soc., V, part 1, p. 268.

Larus minor BONAPARTE, 1856, Comp. Rend., XLII, p. 770.

Laroides subleucopterus BREHM, 1830, Isis, p. 993.

Glaucus glacialis BRUCH, 1853, Journ. für Orn., p. 101.

? [*Larus*] *chalcopterus* BRUCH, 1855, Journ. für Orn., p. 282.

DISTRIBUTION

Partially circumpolar and similar in breeding range to *Larus hyperboreus* but rather more northern; breeding in the Old World from Arctic Siberia to Nova Zembla, and Jan Mayen Island (not Iceland), and in the New World on both coasts of Greenland and west to Victoria Land, a gap occurring from here to the western arctic coast of Siberia; in winter, south to the Baltic Sea, British Isles, Scandinavia, Iceland and the Nova Scotia coast, rarely and accidentally occurring farther south (Bay of Biscay, Madeira, Long Island, New York, Maryland).

MEASUREMENTS

	MALES (7)	FEMALES (6)
Wing	396-433 (412.0)	378-403 (391.5)
Tail	167-178 (173.5)	156-165 (160.3)
Tarsus	55- 63 (58.7)	52- 59 (55.8)
Toe without claw	47- 50 (48.8)	44- 48 (46.0)
Culmen	40- 45 (42.6)	39- 44 (41.3)
Bill at base	14- 17 (15.1)	14- 15 (14.5)
Bill at angle	14.5-17 (15.6)	14-16.5 (15.2)

MOULTS AND PLUMAGES

Natal Down

No specimen examined.

Juvenal Plumage

Figures 215 to 217

REFERENCE SPECIMEN.—J. D., No. 14165; ♂; September 26, 1896; Holstenborg, Greenland.

BACK AND MANTLE-AREA drab to almost white with pale wood-brown mottlings; rump and upper tail-coverts more coarsely barred. HEAD AND NECK dull white, with pale brown streaking. UNDERPARTS grayish wood-brown and white finely mottled or obscurely barred, sometimes pale drab with whitish edgings. WINGS: primaries drab to almost white usually with subterminal "watered" barring, mottling and freckling largely on the proximal quills (sometimes none), the shafts paler straw-color than in *hyperboreus*, secondaries, alula, primary coverts with similar freckling, tertials more barred; greater coverts similar with more freckling or fine barring. TAIL largely white peculiarly mottled, reticulated, or "watered" with pale drab, a narrow (5-8 mm.) subterminal white band, the outer pair of rectrices irregularly barred. BILL, in skins, brownish flesh basally, dull black beyond nostril and fusing into paler base. LEGS AND FEET, in skins, flesh-brown.

Birds resemble miniature *hyperboreus*.

First Winter or Non-nuptial Plumage

REFERENCE SPECIMENS.—L. E. Wyman; ♀; November 24, 1915; Los Angeles, California. J. D., No. 14166; ♀; October 22, 1898; Holstenborg, Greenland. J. D., No. 14164; ♂; December 7, 1898; Holstenborg.

Acquired by a partial postjuvenal moult in August and September.

BACK similar to juvenal but whiter, the mottlings usually more blurred, sometimes only buffy cloudings on white. HEAD AND NECK white with streaking lighter than in juvenal. UNDERPARTS, chin, throat and breast whiter than juvenal with fewer markings; old feathers become bleached. WING AND TAIL of juvenal plumage retained, becoming much worn and bleached. BILL "flesh, tip black" (*ex label*); in skins, yellowish flesh basally fusing into black beyond the angle. LEGS AND FEET "flesh" (*ex label*); in skins, brownish flesh. IRIS probably deep brown.

There is an unusual amount of variation. Some birds have the wings and tail, and even the body, practically white with only a few specklings or cloudings. This is due partly to moult, partly to bleaching, and mostly to individual variation.

First Nuptial Plumage

REFERENCE SPECIMEN.—J. D., No. 52853; March, 1903; St. Kilda Island, Scotland.

Acquired by a partial prenuptial moult, probably in April and May.

Scarcely different from the first winter, although whiter about the head and throat. The juvenal wings and tail form a part of this plumage. Bill and other soft parts little changed.

Second Winter or Non-nuptial Plumage

REFERENCE SPECIMEN.—J. D., No. 7711; winter 1900-01; Tadousac, Quebec, Canada.

Acquired by a complete postnuptial moult in the late summer.

Probably like the same stage of *hyperboreus* only perhaps a little more advanced towards the adult because *leucopterus* is a smaller species.

The above specimen is a second year bird of the "*kumlieni*" type, the primaries and tail a deep drab, the outer primaries with a faint mirror, a little clear gray on the back. I originally mistook it for the juvenal bird and it was so figured (Dwight, 1906).

Second Nuptial Plumage

REFERENCE SPECIMENS.—A. M. N. H., No. 64276; ♀; June 4, 1895; Holstenborg, Greenland. J. D., No. 11577; March 19, 1903; Sable Island, Nova Scotia.

Acquired by a partial prenuptial moult probably in April and May.

No. 64276 is pure white except a small gray area on back, very close to the "*hutchinsi*" type of *hyperboreus*; No. 11577, is a second year

bird of the "*kumlieni*" type. The primaries and tail are counterparts of those of No. 7711 cited above, but the rest of the plumage is very much whiter and there is a larger, though small, patch of gray on the back; the greater coverts and outer edges of the secondaries and tertials are white, only the median and lesser coverts much mottled or flecked. The general effect is that of a white bird with drab wings and tail.

Third Winter or Non-nuptial Plumage

Figure 219

REFERENCE SPECIMEN.—J. D., No. 17487; [no date]; Godthaab, Greenland; apparently a fall bird completing the moult.

Acquired by a complete postnuptial moult in August and September.

MANTLE clear pallid neutral gray except a few frecklings on outer surface of the wings; rump and tail-coverts white. HEAD AND NECK white or sometimes quite heavily streaked on the head and clouded on the neck. UNDERPARTS white. WINGS: primaries and primary coverts and alula white, proximal primaries with slight pale drab freckling; secondaries white or partly gray with some pale drab clouding or darker obscure freckling, especially on the inner members; tertials mostly clear gray; greater coverts white, also partly drab and gray; median coverts with more gray, lesser coverts largely white some with drab shaft-streaks; edge of wing mostly white, lining white with pinkish drab edgings or cloudings. TAIL white, finely mottled or peppered with drab spots on large white areas, outer rectrices largely white. Some tails may become white or with very faint cloudings or frecklings. BILL, in skins, yellowish flesh with trace of a red spot at the angle and a slight trace of a dusky band. LEGS AND FEET, in skins, flesh-brown.

Third Nuptial Plumage

No specimen seen.

Acquired by a partial prenuptial moult in April and May.

Doubtless like the third winter but with an unstreaked white head.

Fourth Winter or Non-nuptial Plumage (Adult)

REFERENCE SPECIMENS.—J. D., No. 31485; ♂; October 28, Iceland; first primary not quite grown. J. D., No. 50880; ♂; February 3, 1901; Julianehaab, Greenland.

Acquired by a complete postnuptial moult in August and September.

MANTLE pallid neutral gray. HEAD AND NECK white, faintly clouded. UNDERPARTS white. WINGS: broadly white at tips, diminishing inwards, merging into gray of mantle; secondaries similar with broad white tips forming a wing-band; primary coverts and alula like mantle, the latter white on outer feather; edge of wing, lining and axillars white. TAIL white. BILL AND OTHER SOFT PARTS brighter than in the third winter. IRIS "yellow" (ex label).

Fourth Nuptial Plumage (Adult)

Figures 218 and 220

REFERENCE SPECIMENS.—J. D., No. 23153; ♀; July 18, 1906; Sarfangack, Greenland. J. D., No. 29022; ♀; April 12, 1909; Julianehaab, Greenland.

Acquired by a partial prenuptial moult in April and May. Like the winter except for a wholly white head. Bill and other soft parts brighter than in winter.

SUMMARY

Larus leucopterus in all of its plumages is only a miniature *hyperboreus* which it seems to parallel even to the all-white second year stage.

There are many reasons for assuming that the gull known as "*Larus kumlieni*" (Brewster, 1883) is a hybrid between *Larus leucopterus* and the Arctic race of the Herring Gull, *Larus argentatus thayeri*. In the first place, after examining many specimens, no two of the adults are quite alike (Figs. 213, 214, 225). They are of the size of *leucopterus* except that the size, especially of the bills, of eastern specimens is larger; birds from the Pacific coast are smaller. The plumage is that of *leucopterus* (possibly in some birds the mantle is a little darker) except that there are subterminal bands of brown or slate on the primaries, the color sometimes extending as smudges down the outer webs of the distal quills, especially the first.

The type of "*kumlieni*" which I have examined is in the U. S. Nat. Museum (No. 76225, ♂, June 14, 1878, Cumberland Sound, Baffin Land) and its wing-pattern is shown by Fig. 213.

Often there are no dusky bands, and towards one end of a series the smudges become less and less, reaching the vanishing point which marks *leucopterus*, and towards the other the bands increase in extent and depth of color until the point is reached where the birds must be called *thayeri*. Young "*kumlieni*" are more abundant in collections than are adults, although both are rare. Paleness (not due to bleaching) of the primaries and tail marks them, the pattern of the tail being that of *thayeri* in the first and second year plumages, the primaries, of course, without mirrors (like other Herring Gulls) in the first year and with a mere trace of a mirror or none the second. It should be noted here that my early description of the supposed juvenal plumage (Dwight, 1906) was derived, as the sequel proves, from a second year bird, for the plate with color in the mantle and an obscure mirror on the first primary indicates this, and a re-examination of the specimen discloses rounded primaries and squarish rectrices. Another item in favor of explaining "*kumlieni*" as a

hybrid is the evidence, slight as it is, derived from the interbreeding of *Larus leucopterus*, ♀, and *Larus fuscus affinis*, ♂, in captivity (Lönnerberg 1919). It is proved that light and dark gulls can and do interbreed, but the single cross did not produce "*kumlieni*." The flesh-colored feet and pale mantle of *leucopterus* were dominant, but the dark wings of *fuscus* were also dominant. An important factor in explaining "*kumlieni*" is its breeding range which, although it is imperfectly known, seems to be Baffin Land and westward. This is just the spot where *Larus leucopterus* and *Larus argentatus thayeri* come together in an area, the eastern part of which, nearest the larger *Larus argentatus smithsonianus*, may well produce the large, larger-billed birds that are found in winter on the eastern shores of Canada and New England, and the western part may produce the small, smaller-billed birds of the Pacific coast, where, only of late years, have they been detected. I have recently examined a specimen in juvenal plumage kindly loaned me by Mr. J. Eugene Law (No. 563, November 18 1906, Long Beach, Los Angeles Co., California), which is much like Eastern "*kumlieni*." Another bird loaned me by Mr. Donald B. Dickey (A. J. van R. No. 6711, December 30, 1921, Buena Vista, Kern Co., California) is also in juvenal plumage and, while it shows some evidence of being "*kumlieni*," it perhaps is nearer *leucopterus*. A third Pacific coast specimen loaned by Dr. L. E. Wyman (No. 992, ♀, November 24, 1915, Hyperion Beach, Los Angeles Co., California) is typical first winter *leucopterus*. Two other specimens in quite dark juvenal plumage (J. D. No. 31329, ♀, January 10, 1912 and J. D. No. 40858, ♀, October 21, 1913, Victoria, B. C.) are referable either to "*kumlieni*" or to *thayeri*, of which they might be considered pale examples—it is almost impossible to draw the line. They are too dark and too small to be *glaucescens*. Summed up, the facts show a complete intergradation in all plumages between pale-primaried "*kumlieni*" and dark *thayeri*, the former merging into *Larus leucopterus*, the latter into *Larus argentatus smithsonianus*. It is a difficult case to explain although the facts are evident. If we accept intergradation as the only criterion for subspecies, we must consider *argentatus* and *leucopterus* as races of one species. The only escape from such a dilemma is to regard "*kumlieni*" and the pale-primaried specimens of *thayeri* which are scarcely if at all different from "*kumlieni*" as hybrids. The case is similar to that of *argentatus* and *fuscus* joined by an intermediate *cachinnans* which seems to have established itself as a species with fixed characters of both the extremes whereas "*kumlieni*" has not,—at least apparently not to the same degree.

These problems go deeper than they appear on the surface and some day we shall know more about the reasons; today we must content ourselves with the facts.

Nomenclatural trouble has developed in this species as in others named by early describers, for no name is safe in the fierce light of modern research. The statement has been made by Hartert (1922, p. 2214) that the name *leucopterus* of Faber (1822) is invalidated because it is preoccupied by *leucopterus* of Vieillot (Tabl. Encyc. at Méth., I, 1820 [not 1821 as Hartert states]) which Hartert considers a synonym of *hyperboreus*. Perusal of Vieillot, however, shows that his *leucopterus* is not his *glaucus* (= *hyperboreus*) which appears on an earlier page (p. 84) and he definitely states that it is not that species. It would therefore appear appropriate to retain the name *leucopterus* of Vieillot, 1820, who gives a good description and will be the authority for the name instead of Faber, 1822, the type locality of Vieillot's specimen being Baffin Bay.

Subgenus **ICHTHYAËTUS**

Larus ichthyaetus

Great Hooded Gull

Figures 227 to 236

Gavia ridibunda phænicopos GMELIN, S. G., 1770, 'Reise durch Russl.,' I, p. 152, Pls. XXX, XXXI.

Larus ichthyaetus PALLAS, 1773, 'Reise Russ. Reich.,' II, p. 713 (Caspian Sea).

Larus leucomelas LESSON, 1831, 'Traité,' p. 617.

Larus kroicocephalus JAMESON, 1839, Journ. Asiat. Soc. Bengal, VIII, p. 242.

Ichthyaëtus pallasii BONAPARTE, 1856, Compt. Rend. Acad. Paris, XLII, p. 771.

Larus ichthyaëtus minor SCHLEGEL, 1863, Mus. Pays-Bas, Lari, p. 34.

Larus innominatus HUME, 1879, Stray Feathers, VIII, p. 394.

Larus affinis BIDDULPH, 1881, Ibis, p. 101.

DISTRIBUTION

Breeding range, the Caspian and Aral Seas, the Sea of Azov and the fresh-water lakes of southeastern Russia and central Asia east to the Irtysh River. Winter range, the eastern Mediterranean and Red Seas, the Persian Gulf and both shores of India; casual records in Ceylon, Tenasserim, Nubia, Sicily, Switzerland (?), and England.

MEASUREMENTS

	MALES (9)	FEMALES (8)
Wing	470-500 (483.1)	422-468 (451.2)
Tail	180-203 (189.8)	171-185 (177.1)
Tarsus	74- 83 (78.5)	65- 76 (71.2)

MEASUREMENTS (*continued*)

	MALES (9)	FEMALES (8)
Toe without claw	55- 59 (57.1)	49- 58 (53.0)
Culmen	58- 65 (61.7)	50- 60 (55.9)
Bill at base	18-21.5 (19.8)	16- 19 (17.5)
Bill at angle	18.5-22 (21.0)	16- 20 (18.4)

MOULTS AND PLUMAGES

Natal Down

REFERENCE SPECIMEN.—Brit. Mus. (Saunders, No. 1766); June; Lower Volga, Russia.

BACK AND WINGS buffy white with faintly indicated dusky freckling. HEAD rather paler and without markings. UNDERPARTS whiter than back and unmarked. BILL, in skin, basally flesh-brown, dusky terminally. LEGS AND FEET, in skin, yellowish brown. IRIS brown (Dresser).

This specimen resembles the downy young of a goose it is so pale and devoid of markings, except on the back.

Juvenal Plumage

Figures 227 to 228

REFERENCE SPECIMEN.—Brit. Mus. (Saunders No. 2969); October 4, 1874; Futtehgurh, Ganges River, India; much worn, a few first winter feathers appearing on the back.

BACK AND MANTLE-AREA rather pale warm sepia, or chocolate-brown with pale buff edgings; rump white, rarely with a few indistinct dusky spots. HEAD buffy, almost creamy white with light streaking posteriorly; the hind neck brown, darker than the back because the edgings are narrower and fewer; eye-crescent and eye-ring dusky. UNDERPARTS white, flecked on the throat and sides of the head, much spotted across the throat. WINGS: primaries brownish black, increasingly lighter on the inner webs inward, the tips paler, becoming, on the inner, whitish, some specimens with fairly distinct, long whitish tongues (short on the tenth but increasing inwards) on all of the inner webs; secondaries, alula and primary coverts dusky with gray or whitish edgings; greater coverts grayish or buff-tinged; tertials largely dusky; wing-lining white with dusky tips to the feathers near edge of wing as if the duskiness extended over from alula and adjacent coverts. TAIL about two-thirds white, the terminal third banded with dull black, tip faintly buffy, the outer pair of rectrices more narrowly banded or only partly dusky, the black blurring into a paler edging on the outer webs which are rarely wholly white. BILL, basal portion gray to pale brownish, subterminally horn-black, tip paler (Witherby); in skin, black, base of mandible slightly brownish. LEGS AND FEET lead-gray to gray-brown (W); in skin, brownish flesh. IRIS brown; eyelids black (W.).

First Winter or Non-nuptial Plumage

REFERENCE SPECIMEN.—Brit. M.; December 31, 1917; Punjab, India; new feathers mostly grown; other specimens in February and March.

Acquired by a partial postjuvenal moult chiefly in October, November, and December.

BACK clear neutral gray, rarely brownish tinged. HEAD white with chocolate spotting like a dark chain on the hind neck. UNDERPARTS white, without markings. WINGS AND TAIL of juvenal plumage retained. BILL AND OTHER SOFT PARTS like the juvenal.

First Nuptial Plumage

REFERENCE SPECIMENS.—Brit. M.; April 8; Futtehghurh, India. U. S. N. M., No. 103385; ♀; October 4; Ganges River India; very worn.

Acquired by a partial prenuptial moult in April and May. Much like first winter, but the head, with an imperfect dusky hood, usually not the clear black of the adult or mixed with gray. Wings, tail, and posterior parts of the body plumage retained from the winter becoming bleached and worn by early summer.

Second Winter or Non-nuptial Plumage

Figures 229 and 230

REFERENCE SPECIMEN.—Brit. M. 91.5.2.103; ♀; December 13, 1878; Weppitan, Burma. Brit. M., 92.5.4.47; ♂; March 21, Mehdue-ghat.; and January to March specimens.

Acquired by a complete postnuptial moult in September, October, and November.

MANTLE partly light neutral gray, partly brownish. HEAD white, sometimes a dusky spotted collar on occiput and hind neck; dusky about the eye. UNDERPARTS white except a dusky spotted collar which sometimes extends from the occiput to the nape and adjacent throat. WINGS: primaries usually without distinct apical spots, but there may be a small mirror on the inner web of the tenth (and even the next) and dull white tongues may be rather extensive on all; secondaries dusky, especially the inner, with white edges, tertials partly gray with dashes of dusky; primary coverts dusky, white-tipped, greater and lesser coverts dusky, extending to the short tertials; lining of wing white, flecked with dusky on the edge. TAIL white, banded broadly, but the band reduced to a dusky spot or a shaft-line on the outer pair of rectrices; sometimes this pair all white. BILL, in skin, yellowish flesh-brown with dull black band. LEGS AND FEET, in skin, a yellowish brown. IRIS "brown" (ex label).

Second Nuptial Plumage

REFERENCE SPECIMEN.—Brit. Mus., 91.6.18.6; ♂; February 27, 1871; Fayûm, Egypt; new black hood appearing.

Acquired by a partial prenuptial moult, not including wings or tail, in February, March, and April. Differs only from the winter in acquiring a black hood and a white nape. Bill and other soft parts acquire some of the color of the adult.

Third Winter or Non-nuptial Plumage

Figures 231 and 232

REFERENCE SPECIMEN.—Brit. M., 92.5.4.118; ♀; November 26, 1873; Futteh-gurh, India; outer primary and tail not fully grown.

Acquired by a complete postnuptial moult in October, November, and December.

MANTLE light neutral gray. HEAD largely white, gray mottling or streaking on occiput and a darker collar on the nape; eye-crescent black. UNDERPARTS white. WINGS: primaries largely white, black subterminally with large white apical spots, mirrors on the outer and on the ninth of variable size, always larger on the outer, sometimes the whole tip white; primary coverts white, gray on the inner webs; wing-lining white. TAIL largely white but dusky smudges and spots on one web or both webs of the middle rectrices; the middle pair and two or three outer pairs wholly white. BILL, in skin, yellow with a black band. FEET, in skin, yellowish brown. IRIS "brown" (*ex* label).

Third Nuptial Plumage

REFERENCE SPECIMEN.—Brit. M., 91.5.20.97; ♂; March 2, 1880; Allahabad, India.

Acquired by a partial prenuptial moult, not including wings or tail, in February, March, and April. Differs only from the winter in the new black hood and white nape. Bill and soft parts have brighter colors.

BILL, in skin, pale yellow with black band beyond angle. LEGS AND FEET "chrome-yellow" (*ex* label); in skin, pale brownish yellow. IRIS "brown" (*ex* label).

Fourth Winter or Non-nuptial Plumage (Adult)

Figures 233 to 236

REFERENCE SPECIMEN.—Brit. M., 91.5.20.84; ♂; February 17, 1872; Mekran coast, Persia, and others of similar dates.

Acquired by a complete postnuptial moult in October and November; adult plumage is now assumed except possibly in some backward birds.

MANTLE light neutral gray. HEAD white with deep gray streaking on occiput, darker collar. UNDERPARTS pure white. WINGS: primaries largely white, inner three gray, apical spots large, black subterminal bands on sixth, seventh and eighth, incomplete on ninth and tenth, extending on outer web of the tenth, these quills and often the ninth with broad white tips; secondaries gray blending into mantle and with broad white tips; other coverts like the mantle. BILL AND OTHER SOFT PARTS like the nuptial but the colors duller.

Fourth Nuptial Plumage (Adult)

REFERENCE SPECIMENS.—A. M. N. H., No. 1094 (no data). Brit. M., 91.5.20.104; ♀; March 20, 1876; Gopalpore, India.

Acquired by a partial prenuptial moult not including wings or tail, in February, March, and April.

Differs from the winter plumage in assuming the deep black hood and white eye-ring interrupted by dusky corner.

BILL wax-yellow with a terminal black band, gape and tip dull crimson (Blanford); orange-yellow, terminal portion orange-red and broad black subterminal band on both mandibles (Witherby). LEGS AND FEET greenish yellow (W.). IRIS brown, eyelids deep red (W.).

SUMMARY

An inland gull of lakes and rivers, one of the largest species and the only very large gull with a hood. This is black in summer and diluted to a gray streaked half-cap in winter. Relationship to the *Larus* group is indicated by size including a large especially long bill with a prominent angle, mirrors in second and third year birds and a very white wing-pattern and tail when adult; to the *Adelarus* group by the banded bill; and to the *Hydrocolæus* group by the black hood in the adult and the banded tail in the juvenal plumage. Relationship to *delawarensis* is suggested by the banded bill of the adult and the banded tail of the young bird.

It is evidently a connecting link between the hooded and the non-hooded gulls and opinions will differ as to which group it resembles most. The value attached to certain of its characters will swing the decision one way or the other.

HYDROCOLÆUS

KEY TO SPECIES IN THE GENUS *Hydrocolæus*

a.—Tail entirely white.

b. White wing-band at ends of secondaries and tertials.

c.—Size small (wing under 230 mm.); primaries gray, white-tipped.

minutus.

cc.—Size medium (wing over 260 mm.).

d.—Primaries white or gray with black subterminal bands or a black line on outer web of tenth.

e.—Mantle deep leaden gray.....*pipixcan*.

ee.—Mantle pale gray.

f.—Bill very stout, black.....*saundersi*.

ff.—Bill longer, reddish (bright red in life)..*melanocephalus*.

dd.—Primaries black except gray inner.....*atricilla*.

bb.—No wing-band at ends of secondaries and tertials.

c.—Outer primaries white basally.

d.—Mirrors present.

e.—Mirrors two, separate from basal white.

f.—Head hooded or white with dark occiput and auriculars.

g.—Hood or head markings brown...*brunneicephalus*.

gg.—Hood or head markings pale gray..*cirrhocephalus*.

ff.—Head wholly white.....*novæ-hollandiæ*.

ee.—Mirrors three, the third joining with basal white.

- f.*—Hood or head markings black; size large (wing over 340 mm.) *serranus*
ff.—Head wholly white; size small (wing under 310 mm.)
novæ-hollandiæ.
dd.—Mirrors absent.
e.—Basal white on both webs. *brunneicephalus*, 2nd year.
ee.—Basal white on outer webs only.
f.—Hood or head markings pale gray.
cirrhocephalus, 2nd year.
ff.—Head wholly white. *novæ-hollandiæ*, 2nd year.
cc.—Outer primaries largely white with black (rarely gray) inner webs.
e.—Primaries banded subterminally or broadly white-tipped.
f.—Bill slender, tarsus stout. *bulleri*.
ff.—Bill stout, tarsus slender. *maculipennis*.
ee.—Primaries black-tipped or white except outer web of tenth.
f.—Bill, black, small and slender. *philadelphia*.
ff.—Bill reddish brown (red in life).
g.—Head hooded or with dusky occiput and auriculars.
ridibundus.
gg.—Head white. *geni*.
aa.—Tail not wholly white.
b.—Central pairs of rectrices pale gray. *pipixcan*.
bb.—Tail banded with black or brown.
c.—Primaries chiefly black.
d.—Outer primaries white-tipped. *pipixcan*, juv.
dd.—Outer primaries black to tip. *atricilla*, juv.
cc.—Primaries with a conspicuous white pattern.
d.—Basal white area on outer primaries.
e.—Primaries without mirrors.
f.—Both webs basally white. *brunneicephalus*, juv.
ff.—Outer webs only basally white. *cirrhocephalus*, juv.
ee.—Primaries with mirrors.
f.—Mirrors large, often three, and confluent with basal white.
g.—Tail-band wider, head browner. *serranus*, juv.
gg.—Tail-band narrower, head whiter. *bulleri*, juv.
ff.—Mirrors smaller, two, not confluent.
novæ-hollandiæ, juv.
dd.—Inner or both webs of the primaries white nearly to tips; no mirrors.
e.—Bill stout.
f.—Primaries with white on inner webs. *melanocephalus*, juv.
ff.—Primaries with white on both webs. *saundersi*, juv.
ee.—Bill slender.
f.—Size very small (wing under 230 mm.) *minutus*, juv.
ff.—Size larger (wing over 250 mm.).
g.—Bill longer (over 35 mm.) *gelastes*, juv.
gg.—Bill shorter (under 35 mm.).

h.—Size smaller (wing under 260 mm.), bill mostly dusky; apical spots on inner primaries usually conspicuous.

philadelphia.

hh.—Size larger (wing over 270 mm.), bill brownish tip dusky; apical spots on primaries usually lacking.....*ridibundus*, juv.

Subgenus **ATRICILLA**

Hydrocolæus atricilla

Laughing Gull

Plate XV; Figures 237 to 242

Larus atricilla LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., I, p. 136, part (Bahama Islands).

Larus ridibundus WILSON, 1814, Am. Orn., IX, p. 89, Pl. LXXIV, fig. 4.

Larus plumbeiceps BREHM, 1824, 'Lehrb.,' p. 722, part.

Xema wilsonii BOIE, 1828, Isis, p. 358.

Larus atricapillus ABBOTT, 1842, Proc. Boston Soc. Nat. Hist., p. 61.

[*Atricilla*] *macroptera* BONAPARTE, 1854, Naumannia, p. 212.

[*Atricilla*] *minor* BONAPARTE, 1854, Naumannia, p. 212.

[*Atricilla*] *catesbæi* BONAPARTE, 1854, Naumannia, p. 212.

Atricilla megalopterus BRUCH, 1855, Journ für Orn., p. 287.

Atricilla micropterus BRUCH, 1855, Journ. für Orn., p. 288.

DISTRIBUTION

The breeding range includes the Atlantic coast of the United States, and the coasts and islands of the Gulf of Mexico and Caribbean Sea; in winter to the northern coast of Brazil and the western coast of South America south to Chile; numerous records of casual occurrence inland in Canada and the United States as far west as Colorado and New Mexico.

MEASUREMENTS

	MALES (16)	FEMALES (10)
Wing	308–330 (321.0)	295–326 (312.3)
Tail	113–133 (122.6)	115–123 (118.5)
Tarsus	50– 54 (51.6)	46– 55 (49.7)
Toe without claw	33– 36 (34.2)	31– 36 (32.7)
Culmen	37– 44 (40.2)	35– 41 (38.9)
Bill at base	10–11.5 (11.0)	10– 12 (10.5)
Bill at angle	10.5–12 (11.3)	10– 12 (10.9)

MOULTS AND PLUMAGES

Natal Down

REFERENCE SPECIMENS.—J. D., No. 56994; ♀; July 12, 1881; Cobbs Island, Virginia. J. D., No. 56889; ♀; July 23, 1881; Cobbs Island, Virginia; juvenal plumage just showing.

BACK AND WING dingy buff with clove-brown markings in distinct, rather narrow lines. HEAD scarcely paler, the brown broken up into numerous spots, mostly small. UNDERPARTS paler but dusky obscure frecklings on sides and large dull black spots and lines on upper throat and chin; a buff throat and paler abdomen unmarked. BILL, in skin, brownish flesh, slightly dusky towards base. FEET, in skin, dusky brownish flesh. IRIS "brown" (*ex label*).

The markings are rather obscure but thickly and uniformly distributed on the dark-toned upper parts, darker and more abundant than in *pipixcan* or any other gull, producing a very dark tone.

Juvenal Plumage

Figures 237 and 238

REFERENCE SPECIMENS.—J. D., No. 45773; ♀; August 17, 1907; Montauk Point, Long Island, New York. J. D., No. 35622; ♀; August 28, 1913; Montauk Point, New York; postjuvenal moult beginning. J. D., No. 56988; ♀; August 15, 1881; Cobbs Island, Virginia.

BACK AND MANTLE-AREA pale clove-brown with pale buff edgings broadest and palest on tertials and scapulars, the feathers brown nearly to the base; rump grayer; tail-coverts white concealing the dark gray basal portion of the tail. HEAD solidly grayish clove-brown with edgings practically absent; hind-neck browner and darker merging into the back; forehead and lores and malar region very slightly paler; black eye-crescent, partial eye-ring gray. UNDERPARTS dingy white with cloudings, whitest on chin and tail-coverts, a broad ill-defined brownish pectoral band (a continuation of the brown from the hind-neck and sides of neck) merging into the dingy white breast and sides; chin distinctly white usually flecked with brown. WINGS: primaries black from the seventh inward, a faint white tipping increasing, the fifth to the first with dingy gray on outer webs, the duskiess becoming less on the inner webs; secondaries black conspicuously white-edged; tertials brown like the back; primary coverts and alula black faintly edged with buffy gray; greater coverts clove-brown with buffy gray edgings, median coverts with more gray and with buff edgings; lesser coverts like the adjacent back; wing-lining and axillars grayish clove-brown faintly edged with buff gray. TAIL one-half to two-thirds basally gray on outer and white on inner webs with a broad terminal dull black band narrowly tipped with buffy white, outer pair with narrowing band and outer web often gray to tip. BILL (see Pl. XV, fig. 1), in skin, dull black, lower mandible slightly brownish at base. LEGS AND FEET (see Pl. XV, fig. 1), in skin, dusky brown. IRIS brown (see Pl. XV, fig. 1); eyelids, in life and in skin, black.

As the wings are so largely black, most of the variation is elsewhere. The tail may have a wider or a narrower band, be whiter or grayer or duskier at base and the terminal white may vary in extent. The back and head may be lighter or darker and the width of the edgings vary and the extent of brown across the breast and its tone is variable. Resembles most *pipixcan*, but wholly brown about the head, the primaries white-tipped and the tail with a wider band also extending farther to include the outer rectrix.

First Winter or Non-nuptial Plumage

REFERENCE SPECIMENS.—J. D., No. 12046; ♂; December 23, 1904; Sawpit Creek, northern Florida. A. M. N. H., No. 153461; March 21, 1915; Balboa, Panama; beginning the prenuptial moult.

Acquired by a partial postnuptial moult in August and September.

BACK deep neutral gray a little browner than adult. HEAD white, occiput spotted or streaked with grayish clove-brown that forms a partial collar on the nape extending to sides of the neck and auriculars which are black; eye-crescent and posterior canthus of eye black; partial white eye-ring posteriorly above and below eye; hind-neck gray, paler than the back extending to the sides. UNDERPARTS white, an inconsiderable dusky gray band on the throat and sides in some specimens and occasional clouding on the breast; some throats mostly white. WINGS AND TAIL retained from juvenal dress. BILL AND OTHER SOFT PARTS much like the juvenal.

First Nuptial Plumage

REFERENCE SPECIMENS.—A. M. N. H., No. 79246; ♂; May 22, 1886; Corpus Christi, Texas: in beginning of the postnuptial moult, new first primary just showing. J. D., No. 4814; ♀; July 16, 1895; Smith's Island, Virginia; postnuptial moult advanced, three juvenal primaries and three outer pairs of rectrices still remaining.

Acquired by a partial prenuptial moult chiefly in March and April.

Differs from the winter in assuming an imperfect black hood varying greatly, the backward birds scarcely different from the winter; wings and tail of juvenal plumage still retained; bill and other soft parts like the winter.

Second Winter or Non-nuptial Plumage

Figures 239 and 240

REFERENCE SPECIMENS.—J. D., No. 11810; ♀; August 10, 1904; New Inlet, North Carolina; new primaries and tail not fully grown. J. D., No. 45775; ♂; September 22, 1899; Chincoteague Island, Virginia; outer primary not grown, rounded tip, tail new.

Acquired by a complete postnuptial moult in July, August and September.

MANTLE like the adult, a deep neutral gray. HEAD white with dusky spotting on occiput and a spotty collar more or less defined on hind-neck; partial white eye-ring interrupted by dusky eye-crescent anteriorly and black line at posterior canthus of eye. UNDERPARTS white, with grayish clouding on sides of throat and breast and on sides. WINGS: primaries black, all except three or four outer with small inconspicuous white apical spots, the fifth gray on outer web, fourth with banded tip or reduced to a spot on inner web, the rest (the inner three), conspicuously gray and with broad white tips; secondaries and tertials clear gray with broad white tips; sometimes secondaries dusky on outer webs; primary coverts black, sometimes suffused with gray or having gray edgings and tips; alula black, inner feathers grayer; edge of wing white, the small coverts adjacent gray or dusky; greater and lesser coverts clear gray like rest of mantle; wing-lining gray or grayish white; alula white. TAIL white sometimes with a

grayish cast basally, usually with evidences of immaturity in rectrices showing narrow dusky shaft-streaks and occasionally subterminal black spots and smudges on central two or three pairs, the middle and outer pairs generally white. Some birds asymmetrically have white rectrices on one side of the tail and smudged quills (juvenal reversion?) on the other (J. D., No. 7279; A. M. N. H., No. 74183). BILL, in skins, black or dusky like the first year. LEGS AND FEET, in skins, blackish brown. IRIS "brown" (*ex* label).

It is probable that comparatively few if any birds become adult in the second year for a large proportion (nearly 50 per cent) of those examined show smudges or shaft lines in the tail, and minute apical spots, and have black alulæ and partly dusky primary coverts, all characters that are midway between juvenal and adult plumages. A few birds have white tails combined with primaries almost devoid of apical spots and with black alulæ and dusky primary coverts. Therefore in spite of comparatively small size, the species seems to have a three-year cycle.

Second Nuptial Plumage

REFERENCE SPECIMEN.—J. D., No. 44004; ♂; April 22, 1916; Seadrift, Texas.

Acquired by a partial prenuptial moult not including the wings or tail, in April and May and sometimes as late as June.

Like the winter plumage except that the head is hooded, black, or imperfectly so or partial in the more backward birds, the nape grayish white. BILL "dark red, end black" (*ex* label); in skin, dull red, dusky near tip. LEGS AND FEET "dark red" (*ex* label); in skin, dusky brown. IRIS "brown" (*ex* label).

Third Winter or Non-nuptial Plumage (Adult)

Figures 241 and 242

REFERENCE SPECIMENS.—J. D., No. 31048; ♀; October 2, 1911; Brownsville, Texas. J. D., No. 51653; ♀; December 12, 1919; New Berlin, Florida.

Acquired by a complete postnuptial moult in July, August and September, often beginning in June (largely in backward birds).

MANTLE deep neutral gray. HEAD like second winter with dusky spottings on white occiput, black eye-crescent. UNDERPARTS white, dusky clouding on sides of throat and breast. WINGS: primaries jet-black, the seventh usually with tongue on both webs, about one half grayish, the sixth or fifth gray with black shaft and subterminal band, the fifth all gray sometimes with a half band or spot, the fourth to first gray, white-tipped, the eighth (rarely the ninth and never the outer) to the sixth with small apical spots increasing in size inwards on tips and becoming a broad white terminal bar from about the fifth to the first. The gray forms a wing-patch including primary coverts parts of inner primaries and is bounded by the black outer webs of three primaries and by the tips of two, and the white edging of the secondaries; primary coverts and alula usually somewhat dusky or with shaft streaks, seldom wholly gray, wing-lining gray; axillars white. TAIL white. BILL (see Pl. XV, fig. 2) "nearly black slightly tinged with red and tip red" (*ex* label); in skin, duller, but not red like

the nuptial. LEGS AND FEET (see Pl. XV, fig. 2) "dusky purplish brown" (*ex label*); in skin, dusky brown. IRIS (see Pl. XV, fig. 2) brown; "eyelids black" (*ex label*).

There is a good deal of variation in adults. Those in the highest developed plumage have the grayest primary coverts, alula and primary-tongues, but more often there are traces of duskiness or shaft streaks. The apical spots also are variable, being larger, whiter and on more of the primaries in the highest developed plumage.

Third Nuptial Plumage (Adult)

REFERENCE SPECIMENS.—J. D., No. 44005; ♂; April 25, 1916; Seadrift, Texas. J. D., No. 34006; ♀; February 18, 1908; Clearwater Harbor, Florida; prenuptial moult beginning on head and throat. J. D., No. 24399; ♀; March 4, 1897; Brownsville, Texas; with hood completed.

Acquired by a partial prenuptial moult in March and April; the wings and tail of winter retained, apparently often blacker from loss of apical spots through wear.

Differs from winter in acquiring a black hood with a grayish bloom like *philadelphia*, a conspicuous white eye-ring and a white nape; bill and other soft parts brighter; eyelids "dull red" (*ex label*).

SUMMARY

The species differs a little from all the others in the peculiar larine bill drooping towards the tip; but it is not the only hooded gull with almost wholly black primaries, for in this respect it resembles *Larus hemp-richi* as it does in red bill with dusky tip or indistinct band. The young bird may be known by its size, black wings, grayish heavily banded tail and brown plumage. The characters are sufficiently marked to warrant placing the species in the subgenus *Atricilla*.

Some years ago the bird of the Bahamas and Antilles was separated from the mainland bird on size (Noble, 1916, p. 367) and an old name (*megalopterus*) revived and applied to it. I do not think there is sufficient difference to warrant this separation for, on careful comparison of a series of fourteen breeding birds from Massachusetts, New York, Virginia, and North Carolina with one of eleven from St. Thomas, St. Martins, and South Andros, I find that the latter average 3% smaller in wing measurements, 3.1% smaller in tail, 4.8% smaller in tarsus, 1% smaller in toe, and 7.5% smaller in bill. The island birds are apparently a little smaller but the percentages of differences are very small for a species of this size, and while the largest island birds do not reach the extreme of the mainland, many of the latter are as small as the smallest of the island specimens. My conclusions are based on material quite independent of

that used by Dr. Noble, whose measurements differ considerably from mine. All of his mainland birds seem to have larger wings than the maximum of any I have found, but I am convinced that under the circumstances the claim for recognition cannot be maintained.³ Too many individual birds examined, from Massachusetts and Texas, are just as small as the smallest West Indian specimens, and the extremes after all are no greater than in other species of similar size. The fact that Bruch named differences proves very little for he was a notorious "splitter" and I am sure that reviving his name for a very small difference in a gull that wanders far in migration only creates confusion unless measurements can be better standardized than they are under present methods.

Subgenus **CIRRHOCEPHALA**
Hydrocolæus brunneicephalus
 Indian Brown-hooded Gull

Figures 243 to 248

Larus brunneicephalus JERDON, 1840, Madras Journ. Lit. and Sci., XII, p. 225 (India).

Chroicocephalus brunniceps CABANIS, 1853, Journ. für Orn., p. 105, footnote.

Larus lachrymosus LICHTENSTEIN, 1854, 'Nomencl. Av.,' p. 99.

Chroicocephalus tibetanus GOULD, 1864, Proc. Zoöl. Soc. London, p. 54.

DISTRIBUTION

Breeding range, central Asia, including Turkestan, Thibet, northern India and southern Mongolia; in winter south to the coasts of India, Ceylon, Baluchistan, Persia and Arabia ranging from Lower Burma to Aden.

MEASUREMENTS

	MALES (13)	FEMALES (12)
Wing	322-347 (338.2)	309-328 (322.7)
Tail	126-140 (135.1)	121-135 (127.5)
Tarsus	49- 55 (52.7)	45- 54 (49.1)
Toe without claw	35- 41 (38.6)	32- 38 (36.2)
Culmen	36- 44 (40.5)	34- 39 (37.7)
Bill at base	11- 13 (11.8)	10- 11 (10.9)
Bill at angle	11- 12 (11.6)	10- 11 (10.4)

MOULTS AND PLUMAGES

Natal Down

No specimen seen.

Juvenal Plumage

Figures 243 to 245

REFERENCE SPECIMEN.—Brit. M., 91.5.20.132; September 7, 1874; Thibet; largely in first winter plumage.

BACK AND MANTLE-AREA largely snuff-brown, the feathers basally (and sometimes almost wholly) gray with paler brown edgings; rump and tail-coverts paler. HEAD AND NAPE browner with narrower edgings; eye-crescent black; dusky auriculars. UNDERPARTS white, slightly buff at sides of neck. WINGS: primaries brownish black with square-ending white areas, or tongues, at the bases, absent or hardly showing on the outer and the ninth, increasing on the others on both sides of the shafts, reaching approximately on outer web of the eighth to 135 mm. from the tip, on the seventh to 110 mm., on the sixth to 50 mm., on the fifth to 40 mm., and on the fourth to 25 mm., the others gray with dark inner webs; very small apical spots increase in size inward from the seventh primary, the outer three (sometimes more) without any; secondaries brownish black narrowly white-tipped; primary coverts and alula white on inner webs and at tips with brown outer webs on two or three and shaft-streaks on one or two, the rest all white; alula tipped with gray; greater coverts partly gray mixed with brown; median and lesser coverts much like back. The wings are chiefly black with a large median white patch bounded by the black ends of the primaries, by their inner webs and by the dusky secondaries. TAIL white with terminal band dull black or clove-brown (about 25–35 mm.) and narrow whitish tipping. The band is equally broad on the median pairs, diminishing to about 15–20 mm. on the fifth pair and usually reduced to a subterminal shaft-line on the outer pair, or sometimes this pair is partly banded or with only a spot. BILL yellowish orange, dusky tip (Blanford); in skin, yellowish brown with dull black tip. LEGS AND FEET orange, web duller; in skin, pale flesh-brown. IRIS hazel (Legge); eyelids, in skin, black.

Most resembles *cirrhocephalus* but the white tongues of the wings cover both webs (not the outer only), the tail band is decidedly broader, the outer pair of rectrices generally has a partial band (instead of being wholly white), the white of the wing forms a smaller patch, not showing till the eighth or seventh primary.

First Winter or Non-nuptial Plumage

REFERENCE SPECIMENS.—U. S. N. M., No. 125670; ♀; October 27, 1891; Kashmir, India. Brit. M. (Saunders No. 3446); ♂; October 8, 1872; Trincomalee, Ceylon. Brit. M., 91.5.20.109; ♂; January 17, 1872; Sindh, India.

Acquired by a partial postjuvenal moult showing in specimens taken from October 8 to February 23 on the coasts of India.

BACK a pallid neutral gray, sometimes with faintly brown edgings. HEAD white except for a dusky gray occipital band or area extending to the blackish auriculars; feathers grayish brown basally; eye-crescent black; eye-ring posteriorly white. UNDERPARTS white. WINGS AND TAIL of juvenal plumage retained. BILL AND OTHER SOFT PARTS much like the juvenal.

First Nuptial Plumage

REFERENCE SPECIMEN.—J. D., No. 50919; ♀; May 17, 1903; Assam, India.

Acquired by a partial prenuptial moult in April and May; wings and tail of juvenal stage still retained, much worn. The mid-pair apparently is sometimes renewed and grows longer than those they replace.

Much like the first winter, but the head, with a brown hood more or less developed, usually not so deep in color as the adult and often with an admixture of new white, feathers especially on the forehead. Bill and other soft parts with increased color; the bill, in skin, dull reddish brown, darker towards tip.

Second Winter or Non-nuptial Plumage (Adult)

Figures 246 to 248

REFERENCE SPECIMENS.—J. D., No. 32841; ♂; November 22, 1907; Assam, India. Brit. M., 91.5.20.122; November 18, 1877; Ajmir, India; outer primaries not fully grown.

Acquired by a complete postnuptial moult at its peak, probably in October or November. It is evident that there is considerable variation in breeding dates at different localities.

MANTLE pallid neutral gray. HEAD white, with grayish brown occiput and darker eye-crescent and auriculars, eye-ring white posteriorly blending with adjacent white. The dark border of the moulted nuptial hood is indicated on nape by an irregular dusky line and there is a white band across occiput below dusky area and before the auriculars. Some specimens have white heads except for the dusky auricular and eye-crescents. UNDERPARTS white. WINGS: primaries have squarish mirrors on the outer and ninth (sometimes, perhaps often, absent), the basal white is increased and extends so as to include both webs at about the eighth or ninth quill, the apical spots increasing in size inwards; the fifth has a broadly banded black tip extending to the posterior margin of the web, the fourth has a band beginning at the shaft and extending along the posterior margin, sometimes with a very small white spot on the anterior web, the third has only a dusky posterior margin, the others are clear gray; edge of wing white, lining pale gray. TAIL white or with dusky shaft-streaks. BILL "deep red, tip horny dusky" (*ex label*); in skin, yellowish flesh with red tinge, tip from angle dusky. LEGS AND FEET "vermilion-red" (*ex label*); in skin, flesh-brown. IRIS "very pale yellow," "gray" (*ex labels*).

In a bird of this size there are probably a considerable number that do not acquire completely adult plumage in the second winter. Evidences of immaturity are found in some specimens (dusky shaft streaks in the tail or primary coverts, and lack of mirrors), but these birds are comparatively few in collections so that there seems to be reason for considering the species as normally having a two-year plumage-cycle, with perhaps a larger number of backward birds than are found in a smaller sized species. It is not an easy matter to determine positively whether a species of this size has a two-year or a three-year cycle.

Second Nuptial Plumage (Adult)

REFERENCE SPECIMENS.—J. D., No. 32840; ♂; May 12, 1907, Bengal, India. Brit. Mus., 91.5.20.800; ♀; March 23, 1875; Madras, India.

Acquired by a partial prenuptial moult plus wear in March, April, and May.

WINGS AND TAIL of winter retained. Much like the second winter, but the head with the fully brown adult hood, darkening to an almost black line at junction with neck and extending farther back on the throat than on the nape; neck pure white, posterior half of broad eye-ring white, a narrow rim of brown feathers. BILL AND OTHER SOFT PARTS similar to winter but brighter colored.

The wide variation in the time of moult is shown by a Chagra specimen which has eight old primaries still remaining as early as July 14, while an Ajmir specimen has outer, and the ninth primary and a new tail, not fully grown as late as November 18.

SUMMARY

A medium sized species, the bill intermediate between the larine or heavy and the sternine or slender-billed gulls. Adults are brown-hooded (head chiefly white in winter) with two squarish mirrors on the two outer primaries and a large white basal patch on the wing (smaller than in *cirrocephalus*) bounded by the black of the primaries and the gray of the inner quills and the greater coverts. Juvenal birds lack the mirrors and have brown instead of gray backs and heads. Because of size there appears to be a considerable number of second-year birds showing evidences of immaturity. The bill, the size, the hood and the wing-pattern indicate close affinity to *cirrrocephala* and *serranus*, also to *novæ-hollandiæ* which latter, however, lacks any hood.

Hydrocolæus cirrhocephalus

Hydrocolæus cirrhocephalus cirrhocephalis-Argentine Gray-hooded Gull

Figures 249 to 260

Larus cirrhocephalus VIEILLOT, 1818, 'Nouv. Dict. d'Hist. Nat.,' XXI, p. 502 (Brazil).

Larus poliocephalus TEMMINCK, 1820, 'Man. d' Orn.,' II, p. 780, footnote.

Cirrrocephalus plumbiceps BRUCH, 1855, Journ. für Orn., p. 288.

Cirrrocephalus major BONAPARTE, 1856, Compt. Rendu, XLII, p. 771.

Cirrrocephalus minor BONAPARTE, 1856, Compt. Rendu, XLII, p. 771.

Larus maculipennis BURMEISTER, 1856, 'Thes. Brazil,' III, p. 448.

Larus polionotus PELZELN, 1871, 'Orn. Brazil,' p. 461.

Hydrocolæus cirrhocephalus phæocephalus-African Gray-hooded Gull

Larus poiocephalus (lapsus!) SWAINSON, 1837, 'Birds W. Africa,' II, p. 245, Pl. XXIX.

Xema phæocephala STRICKLAND AND SCLATER, 1852, 'Jard. Contrib. Orn.,' p. 160.

Chroicocephalus cirrhocephalus LICHTENSTEIN, 1854, 'Nomencl. Av.,' p. 98.

Larus pæocephalus GURNEY, 1860, Ibis, p. 221.

?*Larus hartlaubi* ROCHEBRUNE, 1884, 'Faune Sénag., Ois.,' p. 417.

MEASUREMENTS

MALES

	No. of Skins	Wing	Tail	Tarsus	Toe With- out Claw	Culmen	Bill at Base	Bill at Angle
<i>cirrhocephalus</i>	12	308-338 (325.0)	121-133 (127.7)	50-60 (54.7)	35-43 (40.2)	38-42 (40.3)	10.5-12 (11.3)	10-11 (10.9)
<i>phæocephalus</i>	10	302-325 (317.0)	117-132 (124.5)	50-54 (52.1)	37-39 (37.6)	39-41 (40.4)	8.5-11 (10.4)	9-10.5 (9.8)

FEMALES

<i>cirrhocephalus</i>	10	305-323 (314.9)	120-134 (124.7)	48-54 (51.0)	34-42 (37.2)	35-41 (37.4)	10-11 (10.2)	9-11 (9.9)
<i>phæocephalus</i>	8	285-321 (298.6)	114-123 (117.7)	45-52 (47.5)	32-39 (35.2)	35-37 (36.1)	8.5-10 (9.0)	8- 9.5 (8.7)

DISTRIBUTION

The geographical race *cirrhocephalus* breeds in the river marshes and on some of the lakes of Argentina, Paraguay, Uruguay and southern Brazil; in the non-breeding season ranges along the southeastern coast of Brazil, and the coasts of Argentina, Chile and Peru.¹ The race *phæocephalus* breeds on some of the lakes of Equatorial Africa (Ngami, Victoria Nyanza, Tanganyika, Sherwa, Chilwa, Bangweola, Naivasha and probably others), ranging in the non-breeding season to the eastern, southern and western coasts north to Senegambia and to Durban.

MOULTS AND PLUMAGES

Natal Down

REFERENCE SPECIMEN.—U. S. N. M., No. 213843; ♂; July 21, 1909; Naivasha, British East Africa; the wing quills and tail are just expanding, the juvenal scapulars showing the juvenal brown and the sides of the breast white under the down.

BACK buffy white-marbled and spotted with rather pale clove-brown. HEAD whiter and with darker spotting. UNDERPARTS paler, obscurely spotted, palest on breast and with a dingy band across throat. BILL, in skin, dusky brown, yellowish at base and extreme tip. LEGS AND FEET, in skin, yellowish brown. IRIS probably brown.

Juvenal Plumage

Figures 249 to 251, 255 and 256

REFERENCE SPECIMEN.—U. S. N. M., No. 213853; ♀; August 7, 1909; Naivasha, British East Africa.

BACK AND MANTLE-AREA wood-brown or pale snuff with rather narrow paler edgings, passing to neutral gray on rump; grayish white upper tail-coverts; all the feathers basally gray. HEAD brownish mouse-gray, extending to below eyes, darker auriculars, hind-neck with ill-defined grayish-white collar; forehead lores and large postocular spot whiter; eye-crescent dusky; partial eye-ring posteriorly dull white. UNDERPARTS white, brown-tinged on sides of breast. WINGS: primaries brownish black, lightly tipped (except outer two, sometimes more) with white, increasing inwards, a white area or tongue squarely cut off on outer web at base of the eighth or ninth (and sometimes tenth) increasing rapidly inwards to a maximum on the seventh, sixth, and fifth (forming the white patch of the wing), the fifth or fourth grayer, and the others gray with dusky terminal bands becoming rather blurred, and grayish-white tipping; primary coverts chiefly white, sometimes dusky shaft-streaks and sometimes the inner webs gray; alula and secondaries clove-brown tipped and edged, especially the inner quills, with pale neutral gray; greater coverts dark neutral gray with slight brownish tips paler edged, median and lesser coverts and tertials brown like back; edge of wing white, lining and axillars plumbeous gray. TAIL white with terminal band

¹It seems probable that birds reach the Pacific coast by way of Cape Horn or the Straits of Magellan following the coast rather than crossing the Andes as has been suggested, although the low mountains in southern Argentina and Chile would be no insuperable barrier.

(20–25 mm.) of brownish black, sometimes paler and sometimes with very narrow whitish tipping; band widest on central pairs of rectrices reduced on second pair and usually none on outer pair, or there may be a partial band or spot. BILL “dull yellow” (*ex* label); in skins, dull flesh-brown basally, dusky along commissure and beyond nostril and angle. LEGS AND FEET “dull yellow” (*ex* label); in skins, dull flesh-brown. IRIS “chestnut” (*ex* label).

First Winter or Non-nuptial Plumage

REFERENCE SPECIMENS.—Brit. M., 1916.12.1.123; ♀; December 4, 1912; Lake Naivasha, British East Africa; also March and April South American birds.

Acquired by a partial postjuvenal moult earlier (September to December) in African birds, and later (February to April) in South American birds.

BACK a neutral gray, usually browner than the adult, sometimes with faint brownish edgings; rump white. HEAD white with a pale gray occipital area, or mixed with much gray especially in females; eye-crescent and auricular spot dusky; posterior half of eye-ring white. UNDERPARTS white, sometimes buffy on sides of the throat. WINGS AND TAIL of juvenal plumage retained, worn browner and paler. BILL AND OTHER SOFT PARTS much like the juvenal.

First Nuptial Plumage

REFERENCE SPECIMEN.—Brit. M. (Saunders, No. 3366); ♂; September 13, 1876; Buenos Aires, Argentina.

Acquired by a partial prenuptial moult, not including wings or tail, in Africa in March, April and May; in South America in September and October.

Differs from the first winter in assuming an imperfect light neutral gray hood which is renewed often partly white or mixed with gray, the occipital area darker than the mantle, the neck paler; eye-crescent and auriculars grayer than in winter. The hood may easily be mistaken for the half-hood of the non-nuptial plumage. Bill and other soft parts show signs of adult nuptial colors.

Second Winter or Non-nuptial Plumage (Adult)

Figures 252 to 254, 257 to 260

REFERENCE SPECIMENS.—Brit. M., 1910. 12.22.656; ♀; March 31, 1909; Buenos Aires, Argentina; outer primary not fully grown. Brit. M., 1921. 3.13.2; January 1921; Lake Tchad, Sudan, Africa; wings except one old primary and tail new. Brit. M., 1911. 12.18. 76; ♀; January 3, 1911, Sierra Leone.

Acquired by a complete postnuptial moult from September to January in Africa and from February to March in South America.

MANTLE light neutral gray or darker with a faint purplish tinge. HEAD white with a pale gray, occipital area or half-hood; darker auricular spot and eye-crescent;

anterior half of eye-ring white; hind-neck gray much like the back, but paler, the feathers white basally and narrowly edged. The occiput sometimes fades nearly to white. UNDERPARTS white except traces of gray on sides of the neck. WINGS: primaries with squarish mirrors on the outer and ninth, which are without apical spots (the others have them); basal white hardly showing on the outer and ninth, but a short tongue on outer web of the eighth, broad tongues on the seventh and sixth, the fifth gray with a banded tip, the fourth sometimes partly banded and a deeper gray; the rest gray or with slightly dusky inner edges; secondaries, tertials and coverts gray; primary coverts, alula and small adjacent coverts white; wing-lining gray like mantle; reversed coverts a darker gray. The tongues are not on both webs as in *brunneicephalus*. TAIL white, sometimes dusky on the shafts or webs, indicating a backward bird. BILL "dark crimson" (*ex* label); in skin, brownish flesh with red tinge, tip scarcely darker. LEGS AND FEET "dark crimson" (*ex* label); in skin, brownish flesh. IRIS "pale yellow" (*ex* label); eyelids "dark crimson" (*ex* label).

An apparently backward bird moulting into second winter plumage early as such birds do (A. M. N. H., No. 99976, July 12, 1906, Nakuru, British East Africa), is partly in worn nuptial, partly new winter plumage with new rounded (therefore not first year) primaries, no mirrors, a white tail, a head largely white; a few old brownish feathers chiefly in wings and new, partly dusky secondaries; the bill yellowish flesh-brown, dusky at tip. It is possible that such birds may be more common but, if so, very few have found their way into collections and it is more probable that most birds get the mirrors regularly at the end of the first year, at which time, however, the mirrors may be smaller than at later periods. The species therefore seems to have a two-year plumage-cycle.

Second Nuptial Plumage (Adult)

REFERENCE SPECIMENS.—Brit. M., 94.5.5.26; ♀; June 1, 1893; Lake Shiriva, Nyassaland, East Africa. Brit. M. (Saunders, No. 3370); September 13, 1876; Buenos Aires, Argentina.

Acquired by a partial prenuptial moult, not including the wings or tail, in Africa in April and May, in South America later. The peak of the breeding season seems to be July or August in Africa and October or November in South America.

A very pale gray hood, almost white on the forehead and chin, is assumed; otherwise like the winter. Bill and other soft parts brighter than in winter.

It is rather difficult to follow the moults and plumages of this species because the hood is of such a delicate gray that many of the feathers, especially anteriorly, fade to white, consequently the winter half-hood resembles this partly faded complete hood.

SUMMARY

In this species we have the unusual case of a gull separated into two distinct races by the Atlantic Ocean, for the differences are not specific. It is of interest to note that the South American race is later in the season usually by several months in its moults than the African.

Adults may be recognized by the pale gray hoods (head whiter in winter) darkening at the posterior margin and by the wing-pattern of two squarish mirrors and tongues of white with more or less squared ends on the outer webs of the median four or five primaries. In juvenal plumage, the mirrors are lacking although the tongues are present somewhat diminished, the back and the head are brown, the tail banded and the underparts white. The African race is darker and smaller with decidedly smaller mirrors, although there are intermediate specimens. Measured along the shaft, the mirror on the outer primary of the African race, *phæocephalus*, in twenty-seven adults, varies from 20–47 (average 32.7 mm.), that of the South American *cirrhocephalus* in twenty-three adults varies from 32–55 (average 42.0 mm.).

	<i>cirrhocephalus</i>	<i>phæocephalus</i>
Mirrors measuring	23 adults	27 adults
20–25 mm.	0	2
25–30 “	0	5
30–35 “	2	10
35–40 “	4	5
40–45 “	11	4
45–50 “	3	1
50–55 “	3	0

There are three overlapping characters to distinguish the races: size, size of the mirrors (see Figs. 253, 254, 257 to 260), and color of the mantle. It is rather surprising that the birds should not be more differentiated, and this fact seems to point to a comparatively recent separation about which we may only speculate.

The name applicable to the African race brings up a question of nomenclature. The first name to be considered is *poiiocephalus* (Swainson, 1837). There can be no question that this was intended to be *poliocephalus* (πολιός, hoary gray + κεφαλη head = πολιοκέφαλος, gray-headed), for there is no sense in any other combination of Greek words. The “l” was no doubt dropped out by the printer. If, however, Swainson’s word, impossible in sense as printed, be emended to *poliocephalus* it becomes untenable, because it is preoccupied by *poliocephalus* Temminck (1820, p. 780, footnote) already applied to *cirrhocephalus* and therefore a synonym.

The next available name is *phæocephalus* Strickland and Sclater, 1852, p. 160 and it is amusing, to say the least, to read the comment made in this work on the unfortunate name of Swainson's, which to cap the climax is here misquoted. "Swainson calls this species *pæocephala* (misspelled by him *poiocephala*) a name which would imply green-headed not gray-headed. He no doubt meant to have written *phæocephala* and I have altered the name accordingly."

The critic who wrote this was somewhat careless both in his quotation and in his Greek, apparently deriving Swainson's word from *πόα*, grass, but this is not the point of interest to us. The question is whether "*poiocephalus*" is a misprint, an obvious typographical error that may be corrected according to the rules of nomenclature. My opinion is that if, in the present case, we are not dealing with a perfectly evident misprint then no such thing can ever be proved and nomenclature will continue to be a prey to the feeble-mindedness that never would emend anything once it is in type. I am not opening the door to substitute intention for performance but here there cannot be the slightest question as to intention defeated by a slip in performance.

A common sense emendation is to insert the missing "l." No other rational explanation of the word is possible, for its derivation is obvious. It is a pity it is untenable when emended, for *poliocephalus* (*πολιός*, hoary gray) is far more descriptive than *phæocephalus* (*φαιός*, dusky gray), the name that I believe should be used for the African race.

It is one of the four species composing the subgenus *Cirrhocephala* of which it is the type and recognizable chiefly by size, the size of the bill, and the wing-pattern. The bill is intermediate between the *larine* and the *sternine* types.

Hydrocolæus serranus

Andean Gull

Figures 261 to 266

Larus serranus TSCHUDI, 1844, Wiegmann, Arch. für Naturg., part 1, p. 314 (Peru).
Xema cirrhocephalum PEALE, 1848, 'U. S. Expl. Exped. (Wilkes) Zoöl., Birds,' p. 289.

Chroicocephalus personatus BRUCH, 1853, Journ. für Orn., p. 104.

Larus glaucotes CASSIN, 1858, 'U. S. Expl. Exped.,' Orn., p. 381.

Larus bonapartii SCLATER AND SALVIN, 1868, Proc. Zoöl. Soc. London, p. 178.

DISTRIBUTION

Breeds on Lake Titicaca and some of the high Andean lakes of Chile and Peru, descending in the non-breeding season to the coasts of Ecuador, Peru and Chile.

MEASUREMENTS

	MALES 15)	FEMALES (7)
Wing	348-370 (363.0)	336-358 (349.7)
Tail	140-158 (150.2)	138-149 (144.3)
Tarsus	54- 61 (56.6)	51- 54 (53.1)
Toe without claw	39- 43 (41.1)	37- 40 (38.4)
Culmen	37- 42 (39.0)	33- 37 (35.4)
Bill at base	10- 12 (10.9)	9- 10 (9.5)
Bill at angle	11-11.5 (10.7)	9- 10 (9.5)

MOULTS AND PLUMAGES

Natal Down

Remains of the down are on some specimens examined, but all of them are too advanced to show the pattern

Juvenal Plumage

Figures 261 and 262

REFERENCE SPECIMEN.—J. D., No. 52402; ♂; March 13, 1913; Junin, Peru; some down still adhering.

BACK AND MANTLE-AREA wood-brown, paler whitish edgings, mixed with much pale gray which is chiefly basal, and rump gray, paling to white upper tail-coverts. HEAD uniformly grayish wood-brown without edgings, paler on the crown the feathers basally deep gray, the forehead, lores, a broad eye-ring, postocular stripe and cervical collar grayish white; large eye-crescent and margin of eye-ring black; auriculars deep brown; hind-neck, whiter than the back, the feathers merely tipped with dark wood-brown. UNDERPARTS white, the throat, breast and sides faintly washed with pale wood-brown. WINGS: primaries black with large mirrors on three and white stripes or tongues along the shafts of all; small apical spots increasing in size inwards beginning usually on the ninth or eighth; primary and adjacent small coverts mostly white, the outer with dusky areas; secondaries largely dusky, paler than the primaries, the outer gray-edged, all gray-tipped and the inner chiefly white; tertials dusky mixed with pale brown and gray; median coverts partly wood-brown and gray, the lesser wholly gray, wing-lining gray, edge and axillars white, alula dusky, white on outer webs and adjacent coverts helps to form a large wing-patch. TAIL chiefly white with a subterminal band (20-30 mm.) of brownish black diminishing to a shaft-line, sometimes a smudge, on the fifth pair of rectrices, the outer pair white, the tips of the central pairs pale wood-brown becoming whiter on the adjacent pairs. BILL "blackish" (*ex* label); in skin, dull black, base of lower mandible pale flesh-brown. LEGS AND FEET "blackish" (*ex* label); in skin, dull blackish brown. IRIS "dark brown" (*ex* label); eyelids, in skin, black.

The juvenal bird resembles in wing-pattern the adult very closely.

First Winter or Non-nuptial Plumage

No specimen examined.

Acquired doubtless by a partial postjuvenal moult in March and April, plus wear.

BACK doubtless gray, perhaps with brownish tinge. HEAD probably white, with dusky auriculars and black eye-crescent. UNDERPARTS doubtless white. WINGS AND TAIL of juvenal plumage retained. BILL AND OTHER SOFT PARTS doubtless much like juvenal.

First Nuptial Plumage

No specimen examined.

Acquired doubtless by a partial prenuptial moult not including the wings or tail, in July, August, and September.

Differs no doubt from the first winter plumage in a brownish black, somewhat imperfect hood; fresh mantle like the winter and breast white or perhaps rosier than in winter. Bill and other soft parts much like the juvenal or with a little of the adult colors.

Second Winter or Non-nuptial Plumage (Adult)

Figures 263 to 266

REFERENCE SPECIMEN.—No specimen seen of second year, but the third is represented by B.-S., No. 502; March 23, 1913; Junin, Peru; in postnuptial moult, four old primaries remaining, also old tail.

Acquired by a complete postnuptial moult in February, March and April.

MANTLE pallid neutral gray. HEAD AND NECK pure white, the neck blending into the back, feathers basally gray; dusky auriculars; black eye-crescent nearly surrounding broad white eye-ring that is narrowly black at junction of eyelid. UNDERPARTS white, with rosy tinge. WINGS not much different from the juvenal but both the white mirrors and the tongues larger and broader, and the dusky secondaries and brown lesser coverts replaced by gray. TAIL white. BILL, LEGS, AND FEET "dark reddish" (*ex label*); in skin, blackish brown. IRIS "brown" (*ex label*).

The variation is chiefly on the third primary which may be gray or with a dusky spot or partial band, the fourth rarely without a broad band, the others inward gray.

Although the species is a good-sized one, it seems to reach the adult stage of plumage at this time having, therefore, a two-year plumage-cycle.

Second Nuptial Plumage (Adult)

REFERENCE SPECIMEN.—B.-S., No. 1191; ♂; August 14, 1913; Puno, Lake Titicaca (elev. 12,600 feet), Peru.

Acquired by a partial prenuptial moult not including wings or tail in July and August.

Differs from the second winter in assuming a black hood; the feathers of the mantle and throat are fresh. BILL, LEGS, AND FEET "dark red" (*ex label*). IRIS "brown" (*ex label*).

SUMMARY

In shape of the bill and in wing-pattern this very local inland species of the high Andean lakes shows relationship to *brunneicephalus* on one side and to *novæ-hollandiæ* on the other, the mirrors also suggesting those of the backward second year plumage of *maculipennis*. A peculiarity of the species is that the mirrors and tongues of the juvenal bird differ very little from those of the adult. The affinity, because of size of bill and wing-pattern, seems to be with the *Cirrhocephala* group, which are largely inland or river gulls.

Hydrocolæus novæ-hollandiæ

Silver Gull

Figures 267 to 284

Hydrocolæus novæ-hollandiæ novæ-hollandiæ—Australian Silver Gull

Larus novæ-hollandiæ STEPHENS, 1826, in Shaw's, 'Gen. Zool.,' XIII, part 1, p. 196.

Larus jamesoni WILSON, J., 1831, 'Ill. Zool.,' Pl. xxiii.

Gavia andersonii BRUCH, 1853, Journ. für Orn., p. 102.

Gavia pomarre BRUCH, 1853, Journ. für Orn., p. 103.

Gelastes gouldi BONAPARTE, 1854, Naumannia, p. 216.

Gelastes corallinus BONAPARTE, 1854, Naumannia, p. 212.

Bruchigavia longirostris MASTERS, 1878, Proc. Linn. Soc., N. S. W., p. 201.

Bruchigavia novæ-hollandiæ ethelæ MATHEWS, 1912, 'Birds of Australia,' II, p. 30.

Hydrocolæus novæ-hollandiæ gunni—Tasmanian Silver Gull

Xema jamesonii GOULD, 1848, 'Birds Australia,' VII, Pl. xx.

Larus novæ-hollandiæ LEGGE, 1886, Proc. Roy. Soc. Tasmania, p. 243.

Larus novæ-hollandiæ gunni MATHEWS, 1912, Nov. Zool., XVIII, p. 212.

Hydrocolæus novæ-hollandiæ gouldi—New Caledonian Silver Gull

Larus scopulinus FORSTER, 1844, 'Descr. Anim.' (Licht. Ed.), p. 106.

Gelastes gouldi BONAPARTE, 1854, Naumannia, p. 216.

Bruchigavia novæ-hollandiæ forsteri MATHEWS, 1913, 'Birds Australia,' II, p. 457.

Hydrocolæus novæ-hollandiæ scopulinus—New Zealand Silver Gull

Larus scopulinus GRAY, 1843, in Dieffenbach's, 'N. Zeal.,' II, App., p. 200.

Larus novæ-hollandiæ GRAY, 1844, 'Voy. Erebus and Terror,' Birds, p. 18.

Larus jamesoni GRAY, 1844, 'List Birds Brit. M.,' 'Anseres,' p. 171.

Larus andersoni GRAY, 1871, 'Hand-List Birds,' III, p. 116, No. 11004.

Hydrocolæus novæ-hollandiæ hartlaubi—African Silver Gull

Gavia hartlaubi BRUCH, 1853, Journ. für Orn., p. 102 (Cape of Good Hope and the Indian coast).

? *Larus pæocephalus* GURNEY, 1860, Ibis, p. 221.

Larus poiocephalus LAYARD, 1867, 'Birds S. Africa,' p. 368.

MEASUREMENTS

MALES

	No. of Skins	Wing	Tail	Tarsus	Toe With- out Claw	Culmen	Bill at Base	Bill at Angle
<i>novæ-hollandiæ</i>	11	285-310 (296.2)	110-128 (118.6)	49-56 (52.4)	35-39 (36.7)	33-39 (36.6)	10-12 (11.0)	10-12 (11.0)
<i>gunni</i>	6	282-310 (296.5)	113-126 (118.9)	47-53 (50.3)	36-38 (37.2)	32-37 (35.2)	9-12 (10.7)	9-12 (10.7)
<i>gouldi</i>	7	289-315 (301.6)	110-125 (115.4)	48-58 (52.9)	35-39 (37.0)	38-42 (39.6)	11-12.5 (11.8)	11-12 (11.7)
<i>scopulinus</i>	16	262-286 (273.5)	105-122 (112.7)	42-47 (45.1)	34-39 (36.5)	28-33 (30.5)	9-11 (9.8)	9-11 (9.8)
<i>hartlaubi</i>	5	276-281 (279.8)	103-110 (107.2)	44-46 (45.0)	33-35 (34.0)	31-37 (33.8)	8.5-10 (9.3)	8.5-10 (9.2)

FEMALES

<i>novæ-hollandiæ</i>	6	282-292 (286.4)	112-119 (114.2)	47-55 (51.2)	34-39 (36.0)	32-39 (35.0)	9-11 (10.1)	9-11 (10.1)
<i>gunni</i>	3	284-293 (288.3)	112-122 (116.6)	47-51 (48.7)	35-38 (36.7)	32-34 (33.0)	9.5-10 (9.8)	9.5-11 (10.2)
<i>gouldi</i>	7	275-288 (283.6)	107-118 (112.6)	49-55 (51.0)	33-38 (35.9)	32-41 (35.6)	10-11 (10.4)	10-11 (10.4)
<i>scopulinus</i>	6	254-273 (265.0)	105-117 (114.0)	42-45 (43.3)	34-38 (35.5)	27-30 (29.0)	9-11 (9.7)	9-11 (9.7)
<i>hartlaubi</i>	8	260-275 (266.1)	101-110 (105.1)	41-45 (43.2)	33-35 (33.5)	30-35 (32.5)	8.5- 9 (8.9)	8.5- 9 (8.8)

Larus ridibundus SCHLEGEL AND POLLEN, 1868, 'Faune Madag., Ois.,' p. 146.

Larus cirrhocephalus HARTLAUB, 1877, 'Orn. Madag.,' p. 378.

DISTRIBUTION

(a) *novæ-hollandiæ* (wing-pattern, Fig. 267 to 271).

Breeding range, the coasts, islands and lakes of all southern Australia, including New South Wales (Five Islands), Victoria (Storehouse Island, Montague Island, Ennendale, Lake Colangulac), South Australia (The Coorong, Kangaroo Island, Lake Eyre district), and Western Australia (Cape Mentelle, Lake Muir, Rottnest Island, Bernier Island); in the non-breeding season scattering chiefly northward on the east coast; casual in New Zealand.

(b) *gunni* (wing-pattern, Fig. 272).

Breeding range, Tasmania (Great Lake) and also on the coast (Great Actæon Island); wandering northward to the Australian coast.

(c) *gouldi* (wing-pattern, Figs. 273 and 276).

Breeding range, the islands of the Queensland coast from Torres Strait south to the Capricorn group (Channel Rock, Raine, Howicks', Thursday, Masthead) and the island of New Caledonia; partly resident but wandering in the non-breeding season.

(d) *scopulinus* (wing-pattern, Figs. 275, 277 and 278).

Resident in New Zealand and the Chatham Islands.

(e) *hartlaubi* (wing-pattern, Figs. 279, 281 to 284).

Breeding range, coasts and islands of South Africa, west of the Cape of Good Hope (Saldana and St. Helena Bays), wandering northward on the west coast to Port Nolleth, and Angra Pequena and on the east coast to Natal; recorded (erroneously) from Madagascar.

MOULTS AND PLUMAGES

Natal Down

REFERENCE SPECIMENS.—Tring M.; May 27, 1882; Mackay, Queensland; September 11, 1909; The Coorang, South Australia. Brit. M., 82.2.18.119; June, 1881; Channel Rock, Torres Strait.

BACK very dark buff, thickly mottled with black. HEAD slightly paler and spots smaller and more discrete. UNDERPARTS buffy and dark with rather obscure mottling, the throat and middle abdomen paler and unmarked. BILL, in skin, dusky flesh. LEGS AND FEET, in skin, yellowish flesh. IRIS brown (Littler).

The breeding season is later in the season in the more southern colonies.

Juvenal Plumage

Figures 267 and 268, 273 and 274, 279 and 280

REFERENCE SPECIMENS.—Tring M.; November 16, 1913; Five Islands, New South Wales, Australia; about half-grown and some down still adherent. Princeton Mus. Zoöl., No. 7294; Bass Strait (no date). Brit. M., 1905. 12.548; ♂; January 18, 1905; Albany, Western Australia; a few first winter feathers. Brit. M., 98. 12.2.638; ♀; August 8, 1876; New Caledonia.

BACK AND MANTLE-AREA pale clove-brown with broad wood-brown or pinkish buff edgings; darker than *ridibundus* or *cirrhocephalus* and less solidly brown, more scalloped, feathers paler centrally; much like *bulleri*. HEAD wood-brown, with much basal white of the individual feathers which are little more than tipped with brown and often wear white. UNDERPARTS white, no buff on throat. WINGS: primaries dull black, the ninth and eighth with a little white basally, the seventh and sixth with broad tongues, white on outer, gray on inner webs extending to near the tips which are broadly banded, the fifth to first gray on both webs and at tips and with dusky subterminal bands; all, except sometimes one or two outer primaries, with white apical spots increasing in size inwards and becoming gray at about the seventh; the two outer primaries in *scopulinus*, *gouldi*, and *hartlaubi* at this stage rarely have mirrors (although sometimes very small ones or white shaft-marks are found), in *novæ-hollandiæ* large ones are frequent and in *gunni* they may measure 30 mm. or more in length; the primary coverts are white; the secondaries are gray with clove-brown subterminal spots chiefly on outer webs; the tertials are gray basally with subterminal brown areas and buff edgings much like the back; the greater coverts, gray with narrow subterminal dusky band, tipped broadly with buff; the median and lesser coverts largely clove-brown with buff edgings like the back, the marginals grayer, wing-lining and axillars pale gray; alula, edge of wing, and adjacent small coverts white. TAIL white with a very narrow subterminal dull black or brownish band (not over 6–8 mm. broad), usually much less (2 mm.) and becoming as a rule a mere shaft-speck on the outer pair which is often white; buff tipping fading to white (about 5 mm.). BILL “horn” or “flesh, tip brown” (*ex labels*); in skin, light brownish flesh at base, dusky toward tip. LEGS AND FEET “light brown” or “brown-flesh” (*ex labels*); in skin, flesh-brown. IRIS “brown” or “light drab” (*ex labels*).

First Winter or Non-nuptial Plumage

REFERENCE SPECIMENS.—Brit. M., 1905. 12.26.550; February 8, 1905; Albany, Western Australia. Brit. M., 1901. 1.7.56; May 2; Campbell Island, New Zealand; worn.

Acquired by a partial postjuvenal moult extending from August to February, varying in the several geographical races and depending largely upon the latitude where the race breeds.

BACK light neutral gray. HEAD white, eye-crescent dusky, inconspicuous, no auricular spot. UNDERPARTS white. WINGS AND TAIL of juvenal plumage retained, showing dusky coverts. BILL AND OTHER SOFT PARTS like the juvenal.

First Nuptial Plumage

REFERENCE SPECIMEN.—M. C. Z., No. 25768; September 13, 1896; Anseвата, New Caledonia; very worn and beginning postnuptial moult.

Acquired by a partial prenuptial moult apparently from April to October. Scarcely different from first winter, but white of head fresher and back a clearer gray. The retained juvenal wings and tail become much faded and worn. Bill and other soft parts show imperfectly the colors of the adult.

Second Winter or Non-nuptial Plumage (Adult)

Figures 269 to 272, 275 to 278, 281 to 284

REFERENCE SPECIMENS.—M. C. Z., No. 56042; ♂; December 29, 1897; New South Wales; one old primary remaining. Princeton Mus. Zoöl., No. 7295; ♂; July 13, 1878; Mangane, New Zealand.

Acquired by a complete postnuptial moult at its peak in September in New Caledonia Island and Queensland, in January in southern Australia and even later in New Zealand.

MANTLE light neutral gray. HEAD pure white, no auricular spot. UNDERPARTS white. WINGS: primaries black usually with two large mirrors covering both webs of the outer and ninth (sometimes a third mirror or a broad white tongue or both on the eighth, especially in *gunni*), the amount of basal white and apical spots increased from first winter; secondaries and coverts usually gray or with subterminal dusky brown spots if backward. TAIL white. BILL, in skin, yellowish red, sometimes dusky along tomlia and beyond nostrils, if the individual is backward. LEGS AND FEET, in skin, yellowish brown or flesh-brown. IRIS "white" (*ex label*).

All individuals do not attain the complete adult plumage at this moult, but probably most of them do. The backward birds revert to the juvenal characters which crop out in smaller or fewer mirrors, a smaller amount of basal white on the primaries, duskily marked feathers among the other wing-feathers and a bill less brightly red than in the adult, with a slightly dusky tip.

Second Nuptial Plumage (Adult)

REFERENCE SPECIMENS.—U. S. N. M., No. 70616⁸; June, 1876; Dunedin, New Zealand. Brit. M., 82.12.21.33; March; Auckland, New Zealand; in postnuptial moult three old primaries remaining. Brit. M., 82.2.18.122; ♀; August 24, 1881; Torres Strait, Queensland. Brit. M., 1901.1.7.88; ♂; December 18, 1898; Adventure Bay, Tasmania.

Acquired by a partial prenuptial moult from April to October; wings and tail of winter retained. Not different from the second winter, but fresh mantle, head and breast.

BILL, deep lake red (Legge); in skin, yellowish red. LEGS AND FEET lake-red (Legge); in skin, pale yellow-brown. IRIS pure silver-white, eyelids coral (Legge).

SUMMARY

In order to understand the moults of this widely distributed species it is necessary to remember that the breeding season is different in differ-

ent parts of its range. The birds of northern Australia and New Caledonia Island (*gouldi*) breed chiefly in June and July; southward the birds are later, those of Victoria, New South Wales, South Australia and West Australia (*novæ-hollandiæ*) breeding in September and October; those of Tasmania (*gunni*) in November and December; and those of New Zealand (*scopulinus*) in December and January. The African race *hartlaubi* is recorded as breeding in June. It is probable that there may be considerable variation from these dates but it is evident that the farther from the equator the birds are found, the later the peak of the breeding season. This is what might be expected, as the summer begins later in the year as the equator is left behind, the summer and winter seasons in the Southern Hemisphere being the reverse of those in the Northern.

Many specimens of the series under examination have been deficient in exact data, thereby making the study of the moult unusually difficult, but specimens with data in postnuptial moult are the keys that unlock the puzzle. Fortunately, the second and later postnuptial moults are well represented among the birds examined. It would seem that the species has a two-year cycle, some individuals requiring another year to perfect their plumage.

Although it has been rather difficult to select series of comparable birds with adequate data, certain facts become very evident. One is that we are dealing with a species that is not only distributed along the shores of Australia, New Zealand and the large island of New Caledonia but one that has also a representative geographical race in Africa at the Cape of Good Hope. The African race *hartlaubi* is the smallest of them all, the New Zealand bird *scopulinus* next in size, the wing-pattern (two mirrors) of the two being almost identical. A little larger especially in the bill but of the same wing-pattern is *gouldi* of New Caledonia and the Queensland coast of Australia for, although some 800 miles of water intervene, there seems to be very slight differences in size or wing-pattern between the island and the mainland birds. On the Australian southern coast birds (true *novæ-hollandiæ*) are a little smaller than they are northward while the amount of white in the wing-pattern increases from north to south reaching its maximum in *gunni* at Bass Straits and Tasmania. Roughly speaking, adult *hartlaubi*, *scopulinus*, and *gouldi* have two mirrors on the primaries, *novæ-hollandiæ* three (sometimes two) and *gunni* three, the third spreading into a broad band on the eighth primary. Other races have been described but the characters do not seem to hold, even the differences between those here recognized overlapping consider-

ably. There seems to be no appreciable difference either in size or pattern between *gouldi* of Torres Strait and "*forsteri*" of New Caledonia, while "*ethelæ*" is indistinguishable from *novæ-hollandiæ* so far as available series indicate. As for "*longirostris*" of western Australia it resembles those specimens of *novæ-hollandiæ* which have but two mirrors and is only a trifle larger. Better characters are needed if separation from this race is to be maintained, for other alleged characters fail. In adult specimens which I have examined the bill is the usual clear red of the species and, although the type is described as having the bill black with a very slight tinge of red at the base, this may be a backward bird such (in this character) as may be found in many other species of gulls.

Subgenus **HYDROCOLÆUS**

Hydrocolæus melanocephalus

Adriatic Gull

Figures 285 to 296

Larus melanocephalus NATTERER, 1818, Isis, p. 816 (Padua).

Larus atricilla NATTERER, 1818, Isis, p. 817.

Larus plumbeiceps MEYER, 1822, 'Zusätze zu Meyer and Wolf's, Taschenb.,' p. 202.

Xema caniceps BREHM, 1831, 'Handb. Vög. Deutschl.,' p. 758.

Larus michahellii MÜHLE, 1844, 'Orn. Griechenl.,' p. 138.

Larus leucophthalmus MÜHLE, 1844, 'Orn. Griechenl.,' p. 145.

Gavia affinis NARDO, 1859, Atti, Ist. Ven., (3) IV, p. 1056.

DISTRIBUTION

Breeding range, the Black and the Ægean Seas; in winter, frequents the Mediterranean Sea west to southern France, Spain and Portugal; casual in Bosnia, Herzegovina, middle France, Switzerland, Germany and England.

MEASUREMENTS

	MALES (9)	FEMALES (12)
Wing	291-311 (303.3)	282-296 (289.4)
Tail	118-127 (122.9)	113-120 (116.5)
Tarsus	48- 53 (51.1)	47- 51 (48.3)
Toe without claw	33- 36 (34.3)	32- 35 (33.4)
Culmen	33- 38 (35.5)	31- 36 (33.4)
Bill at base	10- 12 (11.0)	10- 11 (10.5)
Bill at angle	10- 12 (11.3)	10-11.5 (10.7)

MOULTS AND PLUMAGES

Natal Down

REFERENCE SPECIMENS.—Brit. M. (Saunders, No. 1754), June 4, 1872, Knasib, Black Sea.

BACK buffy gray heavily mottled and lined with clove-brown. HEAD similar, less boldly spotted. UNDERPARTS similar, but more finely speckled, the chin, throat and abdomen slightly paler. BILL, LEGS, AND FEET, in skin, dusky yellowish brown. IRIS probably brown.

Resembles *ridibundus* in being dark, but is more finely marked, and freckled rather than spotted, suggesting *atricilla*.

Juvenal Plumage

Figures 285 to 287

REFERENCE SPECIMEN.—U. S. N. M., No. 115475; ♂; October, 1878; Sardinia; partly in first winter plumage.

BACK dark snuff-brown with whitish edgings. HEAD AND NECK similar, fewer edgings. UNDERPARTS white, buffy on the throat. WINGS: dull black, the outer (tenth) primary usually with an irregular white tongue (or broken white area) on the inner web, sometimes no white on the tenth, almost always some on the ninth; other primaries with tongues covering most of the inner webs, leaving the tips and both sides of the shafts black; the seventh and inner quills faintly tipped with white; secondaries with white edgings broadly tipped with white; coverts like the back. TAIL white broadly (30–35 mm.) banded with dull black, less on the outer pair of rectrices, which usually has only a spot or smudge on each inner web. BILL “black, towards base yellow” (Hartert); in skin, yellowish flesh basally becoming dull black beyond the nostril. LEGS AND FEET, in skin, dull flesh-brown. IRIS “brown” (*ex label*).

First Winter or Non-nuptial Plumage

REFERENCE SPECIMEN.—Brit. M., 91.6.18.25; February 19, 1873; Algiers.

Acquired by a partial postjuvenal moult in the fall.

BACK a pale neutral gray sometimes browner than in the adult. HEAD, forehead, anterior part of lores and crown white, the occiput, nape and postocular region with light dusky streaking forming a half-hood; eye-crescent black. UNDERPARTS white, slightly buff on sides of breast. WINGS AND TAIL of juvenal plumage retained. BILL, AND OTHER SOFT PARTS almost the same as the juvenal.

First Nuptial Plumage

No specimen examined.

Acquired by a partial prenuptial moult in early spring; wings and tail of winter retained.

Probably much like the first winter plumage, with a very imperfect hood, the bill and other soft parts perhaps with some of the adult colors beginning to show.

Second Winter or Non-nuptial Plumage

Figures 288 and 289, 291 to 293

REFERENCE SPECIMENS.—Brit. M., 1905.6.28. 1111; February 22, 1873; Algiers. U. S. N. M., No. 103490; ♀; April 11, 1867; the Bosphorus.

Acquired by a complete postnuptial moult in the fall.

BACK pallid neutral gray much like adult. HEAD largely white, a dusky streaked band across occiput; eye-crescent dull black, posterior part of eye-ring white. UNDERPARTS white. WINGS: primary-pattern very variable, usually all quills banded subterminally more or less, the black extending down the outer webs or on both sides of the shafts varying distances, sometimes the tenth with only part of the outer web dusky, and the ninth may be banded or with a similar outer web. There is almost every step from a considerable amount of black to all white with a line of black on the outer primary only. The secondaries are gray with white tips, primary coverts and alula similar or with some dusky markings. TAIL white. BILL, in skin, largely flesh-brown, dusky towards tip. LEGS AND FEET, in skin, yellowish flesh-brown. IRIS brown.

Second Nuptial Plumage

REFERENCE SPECIMEN.—Brit. M., 88.7.26.194; April 13, 1887; Cyprus.

Acquired by a partial prenuptial moult in February, March and April; wings and tail of winter retained. Similar to the winter except that a black hood is assumed.

Bill and other soft parts acquire some of the adult colors, brighter than in winter.

Third Winter or Non-nuptial Plumage (Adult)

Figures 290, 294 to 296

REFERENCE SPECIMEN.—U. S. N. M., No. 103410; ♀; February 9, 1869; Greece; worn.

Acquired by a complete postnuptial moult in the fall.

MANTLE pallid neutral gray. HEAD partly white, a half-hood consisting of dusky streaking chiefly on the occiput and nape, dusky eye-crescent, partial eye-ring white; no decided auricular spot. UNDERPARTS snowy white. WINGS: primaries gradually pale from faint gray to white tips, the inner webs and shafts yellowish white and no definite white tips as in *minutus*. The effect is that of a wing pure white except a black stripe on the outer web of the outer primary, varying in length and in depth of color, sometimes brown, or nearly faded out. Secondaries white, the outer gray basally, primary coverts and alula gray, the outer feather of alula white. TAIL white. BILL, in skin, yellowish flesh with slight and indistinct dusky subterminal band. LEGS AND FEET, in skin, yellowish brown. IRIS "brown" (*ex label*).

The species seems to have a three year plumage-cycle.

Third Nuptial Plumage (Adult)

Figures 290, 294 to 296

REFERENCE SPECIMENS.—Brit. M., 88.7.26.194; ♀; April 13, 1887; Cyprus. M. C. Z., No. 8417; Europe [no other data].

Acquired by a partial prenuptial moult plus wear in February, March and April; wings and tail of winter retained.

MANTLE like winter. HEAD with a jet-black hood; neck white, large white spot above eye posteriorly and another below it separated by black at corner of eye. UNDERPARTS white (except upper throat and chin where hood descends). BILL dark red with slight dusky terminal band (Witherby); bright coral red (Hartert); in skin, pale yellow with a rather obscure and partial subterminal dusky band, rarely absent. LEGS AND FEET dark red (W.); red (H.). IRIS brown (H. and W.); eyelids dark red (W.); in skin, brown.

SUMMARY

Hydrocolæus melanocephalus is not easily fitted into any group of those outlined. Its rather heavy bill shows affinity to *Larus* but its wing-pattern is unlike any other gull, and there is a black hood that links it with the hooded gulls. The wing-pattern in juvenal plumage is similar to that of *ridibundus*, but as maturity is approached, the black areas dissipate giving in second year birds banded primary tips and finally in adults the only black left is a strip on the outer (tenth) primary. It is not surprising, when the extremes, from black to white, are so great, that a considerable percentage of birds at the first postnuptial moult should fail to attain the adult plumage. This is the reason why such a great variation is found in second year birds, and why there are so many of them. It is not easy to say whether the species has normally a two-year or a three-year cycle, for its size indicates a two-year, the peculiarities of plumage a three-year cycle.

Hydrocolæus pipixcan

Franklin's Gull

Plate XV; Figures 297 to 308

Larus atricilla SABINE, 1823, 'App. Franklin's Polar Sea,' p. 695.

Larus franklinii RICHARDSON, 1832, in Swains. and Rich., 'Fauna Bor.-Am.,' II, p. 424, Pl. LXXI (Saskatchewan River, Manitoba).

Larus pipixcan WAGLER, 1831, Isis, p. 515.

[*Larus*] *cucullatus* REICHENBACH, 1848, 'Natatores,' Pl. XXIII, fig. 296.

[*Chroicocephalus*] *kittlitzii* BRUCH, 1853, Journ. für Orn., p. 104.

[*Chroicocephalus*] *schimperi* BRUCH, 1853, Journ. für Orn., p. 104.

[*Chroicocephalus*] *serranus* BRUCH, 1853, Journ. für Orn., p. 106.

Larus cinereo-caudatus PHILIPPI AND LANDBECK, 1861, Wieg. Arch. für. Naturg., I, p. 293.

DISTRIBUTION

Breeding range, the mid-continental lakes of the plains region of the United States and Canada from Iowa and South Dakota to southern Manitoba, Saskatchewan and Alberta; winter range chiefly the Pacific coast of South America south to Valparaiso, Chile; in migration found more or less irregularly in various parts of Canada, the United States,

Mexico and Central America; casual in the West Indies (St. Bartholomew Island) the Hawaiian (Maui Island) and the Galapagos Islands.

MEASUREMENTS

	MALES (14)	FEMALES (12)
Wing	263-286 (277.2)	262-283 (273.2)
Tail	98-111 (103.9)	97-107 (100.7)
Tarsus	41- 45 (42.5)	39- 44 (41.4)
Toe without claw	30- 33 (31.5)	30- 35 (31.1)
Culmen	29- 34 (30.7)	27- 33 (29.2)
Bill at base	8.5-10 (9.0)	8- 9 (8.6)
Bill at angle	8.5-9.5 (9.0)	8- 9 (8.7)

MOULTS AND PLUMAGES

Natal Down

REFERENCE SPECIMEN.—J. D., No. 16601; ♀; July 9, 1906; Walsh, Saskatchewan, Canada.

BACK warm buff, lined and clouded with deep clove-brown which descends to sides and to posterior border of the wings. HEAD similar, a slightly paler buff with small darker spots more or less symmetrically arranged in irregular rows starting at bill with a large black central spot, two rows on the crown and others on sides of head which pass to and across the occiput there growing larger. UNDERPARTS buffy white, richer buff on chin and throat and with an obscure dusky band and some black spots across the upper throat where the down is darker basally; a faint dusky mottling (often absent) on the crissum. BILL "drab to ecru-drab at base and at tip of mandible" (Bishop); in skins, dingy flesh-brown. LEGS AND FEET "drab in front, ecru-drab behind" (B.); in skins, yellowish ochre. IRIS "raw umber" (B.).

The variation is quite marked and chiefly in the lighter or darker tone of the down and in the disposition of the spots. Fading goes on rapidly and the buffs soon fade to white as the down is pushed out on the tips of the juvenal feathers. Resembles *argentatus* but the spotting of the head is more like the back, the spots elongated and indistinct.

Juvenal Plumage

Figures 297 and 298

REFERENCE SPECIMEN.—J. D., No. 16812; ♀; July 30, 1906; Maple Creek, Saskatchewan, Canada.

BACK AND MANTLE-AREA grayish sepia-brown with paler buffy narrow edgings, the feathers basally grayish white deepening to a subterminal dusky brown area; rump neutral gray paling to white upper tail-coverts which nearly conceal the gray of the rectrices. HEAD and nape darker than the back with a dusky half-hood including crown, occiput, neck and sides of head to below the eyes, with narrow whitish edgings giving a streaked effect, auriculars more dusky; forehead, lores and a broad interrupted eye-ring including only the posterior half of the eye, white, generally rather dingy; eye-crescent and about the eye brownish black; nape white washed with pale gray. UNDERPARTS white with slight buffy or dusky clouding on the sides of the throat.

WINGS: primaries dull black with small white apical spots increasing in size inwards, the inner webs paling to gray, the outer web of the sixth or fifth usually somewhat gray, the fifth (or both fifth and fourth) with a subterminal band, sometimes only a spot, the rest usually gray with broad white tips; secondaries centrally dull black gray-edged and broadly white-tipped; tertials like the back and buff-tipped; primary and small adjacent coverts and alula dusky and faintly grayish tipped or edged; greater coverts mouse-gray slightly edged with buff, the inner browner; lesser coverts sepia or grayish brown like the back and buff-edged, the marginals dusky and forming a dark grayish band; edge of wing clove-brown with faint gray edgings white anteriorly; lining and axillars white. Backward birds have smaller apical spots which may be absent on several outer primaries, and more of the primaries have subterminal bands. TAIL pale neutral gray with a broad (15–25 mm.) dull black subterminal band and a narrow buffy or grayish white terminal edging, the outer pair of rectrices usually white with only a shaft-streak or grayer with a dusky spot or partial band. BILL (see Pl. XV, fig. 3) “dark seal-brown or olive-drab, blackish towards tip” (Bishop), “gape and inside of mouth whitish” (*ex* label); in skin, dull black, brownish at base of mandible. LEGS AND FEET (see Pl. XV, fig. 3) “drab” (B.); in skin, dark yellowish brown or brownish black. IRIS (see Pl. XV, fig. 3) “seal-brown or brownish black; eyelids black” (B.).

Resembles most *atricilla* but has white-tipped primaries, and tail-band not extending to outer rectrix, whiter about head and smaller.

First Winter or Non-nuptial Plumage

REFERENCE SPECIMEN.—J. D., No. 27813; ♂; November 10, 1909; Brownsville, Texas.

Acquired by a partial postjuvenal moult beginning as early as July 30 and completed before November.

BACK neutral, often brownish gray. HEAD with a dusky streaked half-hood much like juvenal but blacker, blackest in auricular region and across occiput; hind-neck gray, but paler than back, sometimes with a few new grayish feathers that make dark spots or cloudings on sides of neck; a somewhat spotted effect on crown and elsewhere, even sometimes on the usually white forehead. UNDERPARTS white, grayish clouding on sides of neck. WINGS AND TAIL of juvenal plumage retained. BILL AND OTHER SOFT PARTS like the juvenal

First Nuptial Plumage

Figures 299 to 301

REFERENCE SPECIMEN.—J. D., No. 52403; ♂; May 8, 1913; Ancon, Peru.

Acquired by a complete prenuptial moult, and this is the only species of gull that has a complete moult at this stage of development. The primaries are replaced slowly, the new feather reaching nearly full length before the adjacent one falls. It takes place in Chile and Peru in February, March, April and May as shown by a number of specimens with partly grown primaries and rectrices. Two specimens, B.-S.. No. 2265, March 9, 1914, Valparaiso, Chile, and No. 515, ♀, April 24, 1913, Ancon,

Peru, each still retain four of the old primaries, the rest of the quills and the tails being new. Another specimen, B.-S. No. 2267, ♂, March 16, has only two old primaries left, five more birds of dates May 5–12, Ancon, Chile, are wholly in fresh plumage except that the black hoods are not completed, and one, A. M. N. H. No. 95396, ♂, May 28, 1895, Lincoln, Nebraska, is also in wholly fresh plumage with a full black hood, which in some cases seems to be even later in replacement than the tail.

MANTLE deep neutral gray like the adult sometimes with a brownish tinge on the greater coverts. HEAD with a brownish black hood mixed with gray in some specimens; neck white between it and the back. UNDERPARTS white, usually with a slight rosy tinge, except where dark hood extends on throat. WINGS: primaries black subterminally on five or six and on the outer webs of the tenth and ninth, with gray tongues on both webs reaching to within 65–90 mm. of the tip of the tenth and the black diminishing to bands on the seventh, sixth and fifth or a spot only on the fifth, the rest gray with white tips, the ninth to fifth with apical spots; the gray of the outer webs is often faintly “peppered” with brown; the primary coverts are brownish gray with dusky areas along the shafts; alula dusky on inner webs. TAIL white, central feathers more or less gray, some backward specimens showing dusky shaft lines and occasionally spots corresponding in position to the band of the juvenal tail. BILL, in skins, black with a reddish tinge, the edge of gonys and nail pale red. Bills of United States and Canadian specimens are like this in May and in the breeding season; South American bills are wholly black because the change does not take place until the birds have moved north. OTHER SOFT PARTS much like the winter.

Second Winter or Non-nuptial Plumage (Adult)

Figures 302, 303 and 306

REFERENCE SPECIMEN.—J. D., No. 16883; ♂; August 4, 1906; Maple Creek, Saskatchewan, Canada; retains only two old primaries, new tail and body plumage growing.

Acquired by a complete postnuptial moult in July and August in Canada. July specimens from Canada show the early beginning of this moult and are losing primaries and tails. A bird (B.-S., No. 2285, March 14, Valparaiso, Chile) has apparently recently completed this moult; a bird, (J. D., No. 14591, ♂, December 25, 1903, Talcuhan, Chile) with three old primaries and a new, still growing tail is almost the counterpart of No. 16883 above cited. This bird perhaps is in the prenuptial moult although the date is too early but it is too late for the post-nuptial so the only conclusion is that this is an exceptional specimen.

MANTLE deep neutral gray slightly paler than *atricilla*. HEAD white, forehead and crown with a half-hood to level of eyes, dull black with white-edged feathers much like first winter. UNDERPARTS white. WINGS: primaries with less subterminal black than in the first winter and with larger apical white spots, the outer only with a black outer web, often with a small mirror, the seventh banded, the sixth (except rarely) with only a spot on the inner web and the rest gray, broadly white-tipped;

secondaries like the inner primaries; primary coverts gray occasionally showing a little dusky marking in backward birds. TAIL white central pairs of rectrices gray. BILL (see Pl. XV, fig. 4) "black washed with burnt sienna or liver-brown at tip" (Bishop); in skin, dull black. LEGS AND FEET (see Pl. XV, fig. 4) "dull reddish chestnut" (B.); in skin, brownish black. IRIS (see Pl. XV, fig. 4) "burnt umber" (B.).

Second Nuptial Plumage (Adult)

Figures 303 to 305, 307, and 308

REFERENCE SPECIMEN.—J. D., No. 31816; ♀; April 23, 1912; Brownsville, Texas.

Acquired by a complete prenuptial moult, unique among gulls. Many February and March birds from Peru are in various stages of moult with old and new primaries and tails; April and May birds reach the United States with the moult barely completed or an old primary or two still remaining.

MANTLE gray, like the winter. HEAD with deep black hood, broad eye-ring white posteriorly divided by black line, anterior quadrant black like hood. UNDERPARTS white, rosy tinted except where hood reaches the throat. WINGS: primaries, outer to sixth with black bands and black outer web of first, apical spots large and whole tip for 15 mm. white on first; basally deep gray paling to white on inner webs and terminally. TAIL white, gray central pairs. BILL "claret-brown or maroon, blackish bar or spot towards tip which is dragon's blood red; gape scarlet" (Bishop); "dark reddish" (*ex* label); in skin, dull yellowish red with or without dusky mark or band beyond the angle, chiefly on the mandible. LEGS AND FEET "bay or burnt sienna" (B.); "blackish" (*ex* label); in skin, dusky brown. IRIS "Prout's or burnt umber-brown" (B.).

SUMMARY

The small size and the wing-pattern (very like that of *ichthyaetus*) distinguish this gull in all plumages, and when adult the two central tail feathers are gray basally unlike any other species. The very dark half-hood of the winter plumage is a good deal like that of *belcheri* and is different from the gray partial hoods of any of the other species. The juvenal plumage might be mistaken for that of *atricilla* but the latter is uniformly browner especially about the head and does not have the white of *franklini* that contrasts with the half hood. The tail-band too is very much narrower and does not reach the outer rectrix and the primaries are white-tipped.

The complete moult occurring at the prenuptial season is a feature unknown in other gulls, but the evidence of its occurrence is conclusive. It may perhaps be linked with the origin of the species, as *pipixcan* is the only species that regularly breeds in the Northern Hemisphere and then migrates to south of the equator.

If we suppose that, like *maculipennis*, it nested and moulted at one time only south of the equator and, as it extended its range, climatic conditions necessitated a change in the breeding season, why does it not breed south today? And why the double complete moult? It is a matter for speculation and the case of *pipixcan* is unique among the gulls. If the colonies had breeding peaks at widely different times of the year, it would be easy to explain the moult but no evidence has been produced to show that the species breeds anywhere except at the northern fringe of its range and only during the months of July and August.

Wagler's description of both old and young is a good one and his name, barbarous as it is, must stand if the supposed dates of publication of the names *pipixcan* and *franklini* are correct.

Hydrocolæus bulleri

Buller's Gull

Figures 309 to 314

Gavia pomare BRUCH, 1855, Journ. für Orn., p. 285.

Bruchigavia melanorhynchus BULLER, 1869, Ibis, p. 43.

Larus bulleri HUTTON, 1871, 'Cat. Birds N. Zeal.,' p. 41.

DISTRIBUTION

Breeding range, some of the inland lakes (Lake Guyon) and rivers (Wairu) of New Zealand (South Island) moving to the coast and adjacent islands in the non-breeding season.

MEASUREMENTS

	MALES (5)	FEMALES (7)
Wing	290-304 (295.2)	269-287 (277.7)
Tail	105-114 (110.0)	102-116 (107.1)
Tarsus	41- 45 (43.0)	37- 44 (40.7)
Toe without claw	32- 33 (32.2)	29- 33 (30.8)
Culmen	35- 39 (36.8)	32- 37 (34.1)
Bill at base	8- 9 (8.6)	8-8.5 (8.1)
Bill at angle	8- 9 (8.5)	7.5-8.5 (7.9)

MOULTS AND PLUMAGES

NATAL DOWN

No specimen seen.

Juvenal Plumage

Figures 309 and 310

REFERENCE SPECIMEN.—J. D., No. 52486; ♀?; February 14, 1906; Lake Wakatipu, New Zealand; partly in winter plumage.

BACK AND MANTLE-AREA largely gray with pale clove-brown subterminal spots and still paler tips and edgings; rump pale gray; upper tail-coverts white. HEAD pale grayish or brownish buff, deepest on occiput, white on forehead, sides of head and neck; auriculars faintly gray; slight eye-crescent black. UNDERPARTS white. WINGS: primaries partly black, two elongated mirrors and broad white tongues along the shafts except on the tenth and running down both webs of the three distal, white apical spots increasing inwards, the seventh and sixth grayer on inner webs, fifth to first gray on both webs with subterminal dull black bands; primary coverts white, the two outer with dusky edges; secondaries gray like back with clove-brown areas chiefly towards ends of outer webs, a few of the inner quills wholly gray; tertials gray like the secondaries with variable but smaller dusky areas and paler subterminal shaft-streaks; greater and lesser coverts wholly gray, the median gray, brown-edged in part like the back. TAIL nearly all white with only slight touches of clove-brown on the outer terminal edges of several median pairs of rectrices, the two outer pairs wholly white. BILL yellow, horn-color anteriorly (Saunders); in skin, pale brownish flesh base; dusky tip beyond angle. LEGS AND FEET dull yellow (S.); in skin, yellowish flesh-brown. IRIS probably brown.

First Winter or Non-nuptial Plumage

REFERENCE SPECIMEN.—Brit. M. (von Hugel); ♂; February, 1878; Satewater Creek, Canterbury, New Zealand.

Acquired by a partial postjuvenal moult in February and later, plus wear of the rest of the plumage.

BACK becomes almost wholly gray with faint brown and buff edgings. HEAD white, an obscure grayish band across the occiput; faint dusky eye-crescent. UNDERPARTS white. WINGS AND TAIL retained from juvenal plumage. BILL AND OTHER SOFT PARTS like the juvenal.

First Nuptial Plumage

No specimen examined.

Acquired by a partial prenuptial moult probably in the late fall (October or later).

The body plumage is doubtless like the winter, the juvenal wings and tail being retained and becoming much worn; bill and other soft parts much like the juvenal.

Second Winter or Non-nuptial Plumage (Adult)

Figures 311 to 314

REFERENCE SPECIMEN.—Brit. M., 75.2.24.3; September, 1872; Waima Kariri, New Zealand.

Acquired by a complete postnuptial moult apparently in December and January or later.

MANTLE pallid neutral gray. HEAD, UNDERPARTS AND TAIL pure white. WINGS: primaries largely black with large white areas along the shafts expanding on the two outer leaving the tip of tenth nearly white, the ninth to first with subterminal

black bands, the seventh (or sixth) to first with the inner webs gray; secondaries gray, no wing-band, lining grayish. BILL black. LEGS AND FEET blackish-brown (Buller); in skin, black. IRIS "white" (*ex label*).

Second Nuptial Plumage (Adult)

REFERENCE SPECIMEN.—Carnegie M., No. 24405; ♀; December 2, 1902; Timaru, New Zealand.

Acquired by a partial prenuptial moult in September and October; wings and tail of winter retained. The nuptial does not differ much from the winter plumage although the white breast has a more rosy tint in the breeding season. Bill and other soft parts like the winter, the bill reddish towards the base and the eyelids vermilion; iris silvery white (Buller).

SUMMARY

An isolated species marked by small size, a black bill more slender relatively and nostrils more linear than any other gull and in the adult a white head at all seasons and a primary pattern with large areas of white, the inner webs black and some of the tips banded. A claim for generic separation might be advanced if the characters were not so intertwined with those of other species. The bill resembles that of *philadelphia*, the wing-pattern that of *saundersi* as well as the backward second year *maculipennis* while the white head is shared by *gelastes* and *novæ-hollandiæ*, both of these however differing in wing-pattern.

Bruch in 1855 originally described this species under the name "*pomare*," but previously in 1853 he had already used this name (although spelled "*pomarre*") for *novæ-hollandiæ*, so it is preoccupied and unavailable. The next name "*melanorhynchus*," given by Buller in 1869, is not available because it is preoccupied by the "*melanorhynchus*" of Temminck a synonym of *philadelphia*. Hutton's name *bulleri* must therefore be used.

Hydrocolæus maculipennis

Patagonian Brown-hooded Gull

Figures 315 to 326

Larus maculipennis LICHTENSTEIN, 1823, Verzeich. Doubl. Zool. Mus., II, Vögel, p. 83 (Montevideo, Uruguay).

Larus ridibundus KING, P. P., 1828, Zoöl. Journ., IV, p. 104.

Larus glaucodes MEYEN, 1834, Nov. Act. Acad. Cæs. Leop., XVI, 1st Suppl., p. 115, Pl. xxiv.

Xema cirrhocephalum DARWIN, 1841, 'Zool. "Beagle,"' II, Birds, p. 142, part.

Larus albipennis GRAY, 1844, 'List Birds Brit. M.,' 'Anseres,' p. 173.

Chroicocephalus glaucotes BRUCH, 1853, Journ. für Orn., p. 105.

Gavia roseiventris GOULD, 1859, Proc. Zoöl. Soc. London, p. 97.

Larus serranus BURMEISTER, 1861, 'Reise durch La Plata-Staaten,' II, p. 519.

DISTRIBUTION

Breeds in Tierra del Fuego, the Falkland Islands and others off the coast of Patagonia; migrating northward on the Atlantic side to southern Brazil and on the Pacific to Peru.

MEASUREMENTS

	MALES (11)	FEMALES (7)
Wing	280-310 (292.1)	271-292 (284.6)
Tail	113-127 (120.0)	111-119 (114.9)
Tarsus	45- 51 (46.4)	44- 46 (45.0)
Toe without claw	34- 37 (35.3)	33- 35 (34.1)
Culmen	34- 39 (36.0)	32- 37 (33.6)
Bill at base	9-11.5 (10.1)	8- 10 (9.1)
Bill at angle	9- 11 (9.8)	8.5- 9 (8.8)

MOULTS AND PLUMAGES

Natal Down

REFERENCE SPECIMEN.—Brit. M. (Saunders, No. 3888); E. Falkland Island, (no other data).

BACK rich buff, heavily marked with black lines or spots. HEAD similar, spots clearer. UNDERPARTS paler buff, unmarked. BILL, LEGS, AND FEET yellowish brown (Saunders). IRIS probably dark brown.

Resembles *ridibundus* quite closely, being dark in tone and a deep buff.

Juvenal Plumage

Figures 315 to 318

REFERENCE SPECIMEN.—B.-S., No. 2913; ♂; February 12, 1915; Puntas Arenas, Chile; and many others of similar dates.

BACK AND MANTLE-AREA bistre-brown with snuff-brown or paler edgings, the feathers basally gray. HEAD, crown, and auriculars drab or dusky snuff-brown with indistinct paler edgings; eye-crescent black, rest of the head white; a white collar, the hind-neck brown like the back. UNDERPARTS white, sides of the neck, throat and breast and sometimes across the breast tinged with buff or pale snuff-brown with a few similar markings occasionally on the sides; these tints fade rapidly sometimes to white. WINGS: primaries black, white-tipped and with elongated mirrors of variable size on the outer and ninth, these two with little or no white at the base, the eighth however usually has the outer web grayish white nearly to tip but terminally restricted more or less to the shaft by black edging beginning about half-way between the ends of the primary coverts and the tip, the seventh and sixth similar, the fifth to first decidedly grayer with dull black subterminal bands and pale gray apical spots; primary coverts and alula white, occasionally with dusky and gray edgings; secondaries dull black or clove-brown with broad gray margins and tips; tertials similar but the inner feathers with brown edgings like the back; greater coverts clear gray like the adult, faintly brownish at the tips; median coverts gray basally with rather narrow snuff-brown terminal areas edged with paler brown; lesser coverts also brown and like the back, the marginals gray; edge of wing and axillars

white; lining grayish white. TAIL white with rather narrow (seldom over 15 mm. and widest on the three central pairs) dull black or brownish subterminal band, narrower on the fourth and fifth often absent on the outer pair and the next pair most often merely lightly spotted on the shaft or edges of the web, narrow (2-3 mm.) white terminal edging; occasionally tails are almost wholly white, touched only with brown. BILL "brownish, tip blackish" (*ex* label); in skins, flesh-brown basally merging into dusky tip at angle. LEGS AND FEET "brownish flesh" (*ex* label); in skin, flesh-brown. IRIS "brown" or "brownish" (*ex* labels).

First Winter or Non-nuptial Plumage

REFERENCE SPECIMENS.—B.-S., No. 2496; ♂; April 15, 1914; Ancud, Chile. J. D., No. 52407; ♀; October 2, 1913; Corral, Chile; very worn.

Acquired by a partial postjuvenal moult the end of February and in March and April.

BACK pale neutral gray sometimes with whitish edgings. HEAD white, sometimes grayish on occiput, nape somewhat grayer as it blends into the back, a dusky auricular spot and eye-crescent. UNDERPARTS pure white sometimes with a slight rosy hue. WINGS AND TAIL of juvenal plumage retained, the edgings fading to white and becoming rather inconspicuous. BILL AND OTHER SOFT PARTS like the juvenal.

First Nuptial Plumage

REFERENCE SPECIMENS.—B.-S., No. 4788; ♀; October 17, 1914; Mar del Plata, Argentina. J. D., No. 52409; ♀; October 19, 1914; Mar del Plata, Argentina.

Acquired by a partial prenuptial moult in September and October which seems to regularly include the tail, but not the wings.

BACK gray like the winter. HEAD with a deep brown hood which is often imperfect and largely white or mixed brown and white; dusky eye-crescent; broad white eye-ring on posterior two-thirds of lid; the neck white. Some birds get white again on the forehead, and seem to reassume the white winter head or only a scattering of brown. UNDERPARTS white, except where the hood extends, this is sometimes reduced to a scattering necklace of dusky spots. TAIL, a few central pairs of the quills (sometimes all) new white. The only gull regularly moulting the tail at the prenuptial period as shown by many (about twenty) specimens in September and up to October 27. One bird of November 4, Falkland Islands is still in full worn first winter plumage without hood; Corral, Chile, specimens seem later in getting the hood than those from Mar del Plata, Argentina. BILL AND OTHER SOFT PARTS much like first winter, but bill somewhat red with a dusky tip.

Second Winter or Non-nuptial Plumage (Adult)

Figures 319 to 326

REFERENCE SPECIMEN.—B.-S., No. 2510; ♀; April 17, 1914; Ancud, Chile; tenth primary just grown, tail new.

Acquired by a complete postnuptial moult in February, March and April.

MANTLE pale neutral gray like the first winter, perhaps clearer. HEAD white, like the first winter but less gray clouding on occiput; backward birds have new

dusky feathers mixed with the white and the gray. UNDERPARTS pure white, with a rosy tinge, the apparently backward birds show a faint brown circlet on the throat and fleckings on the chin. WINGS: primaries with black on the inner webs curving more or less across the tips in half or full bars or these may be lacking; the two outer (or more) quills may have long white tips, the median usually have crenelations or spots of black, the inner four or five are almost wholly gray; the outer web of the tenth is always black basally and the ninth may or may not have a dash of black, the ninth, eighth and seventh are white on the outer web, the sixth pale gray, the fifth to first almost entirely deep gray on both webs; the heavily barred specimens are almost identical with the juvenal having large mirrors on the two outer and white apical spots; secondaries, tertials and rest of mantle gray; alula, axillars, edge of wing and adjacent coverts white; under coverts pale gray. TAIL pure white. BILL "reddish, tip blackish" (*ex label*); duller in skin. FEET "reddish" (*ex label*); in skin, flesh-brown. IRIS "brown" (*ex label*).

The great variation in the wing-pattern as the advance to maturity proceeds has led to the conclusion that in banded and unbanded specimens the differences represented two species which have long passed current, the one with banded primaries, as *maculipennis*, and the white-primaried birds, as *glaucodes*. But a large series of specimens in the Brewster-Sanford collection at The American Museum of Natural History quite unexpectedly proves that the differences are due to age and individual development and that there is only one species. The perfectly adult bird is "*glaucodes*" and the backward second year (not the usual second year) or reversionary type of plumage with much more black in subterminal bands and little white is *maculipennis*. The species must be called by the latter name as it has eleven years priority over *glaucodes*. The diagrams drawn from specimens I have examined show that there is a complete series of wing-patterns connecting the *maculipennis* extremes. In the juvenal or first year plumage, the variation is from small mirrors to large ones (Figs. 315 and 317). The second year plumage is shown to vary from banded primaries (Fig. 319, the pattern that was given the name *maculipennis*) to entirely white-tipped ones that received the name *glaucodes* (Figs. 323 to 326). The great similarity between Figs. 317 and 319 should be noted, a reversion in the second year to the juvenal type. Such birds are found in small numbers in every species of gull and are more striking in species that ultimately have the whitest primaries. They are the same sort of birds that are found in *melanocephalus*, a species that also has very white primaries when adult. The black bars or crenelations or spots are the persistence of juvenal characters in feathers that after the moult in normal individuals are white. Birds showing them to excess are laggards in the advance towards the adult stage.

Second Nuptial Plumage (Adult)

REFERENCE SPECIMENS.—B.-S., No. 1440; ♂; September 22, 1913; Corral, Chile. J. D., No. 52406; ♀; September 13, 1915; Rio Gallegos, Argentina.

Acquired by a partial prenuptial moult in September and October. The brown hood darker at junction with neck and the broad white horse-shoe-shaped eye-ring on posterior two-thirds of lids is assumed, also a new white rosy tinged throat, neck and breast, a new gray mantle, and apparently a new tail (which is very unusual for any gull). The wings of the winter plumage are retained. Bill, legs and feet "reddish black" (*ex label*), duller in skin, but the bill often remains red for several years.

SUMMARY

The species when adult may be recognized by size, a rather slender red bill, a brown hood in summer, a white head with dusky auriculars and eye-crescent in winter and by the wing-pattern. Juvenal birds are pale brown above and white below with elongated white mirrors and much black in the wing-pattern. A backward second year bird with wing-pattern much like the juvenal received the name *maculipennis* and the usual second year or adult bird was later named "*glaucodes*." These backward second year laggards are comparatively few in number and show by deficiency of pigment in paler brown hoods and duller colored bills, as well as in juvenal wing-pattern, that they are not quite normal individuals.

The type of "*Larus albipennis*" is in the U. S. Nat. Museum (No. 15507, ♂, Coast of Chile) where I have examined it. It is *maculipennis*.

Hydrocolæus ridibundus

European Black-headed Gull

Figures 327 to 332

Larus cinerarius LINNÆUS, 1766, 'Syst. Nat.,' 12th Ed., I, p. 224.

Larus ridibundus LINNÆUS, 1766, 'Syst. Nat.,' 12th Ed., I, p. 225 (Europe).

Larus erythropus GMELIN, 1789, 'Syst. Nat.,' XII, p. 597.

Larus atricilla RETZIUS, 1800, 'Fauna Suec.,' p. 160.

Larus canescens BECHSTEIN, 1803, 'Orn. Taschenb.,' II, p. 370.

Larus capistratus TEMMINCK, 1820, 'Man. d' Orn.,' 2d Ed., II, p. 785.

Larus nævius PALLAS, 1826, 'Zoogr. Rosso-Asiat.,' II, p. 327.

Xema pileatum BREHM, 1830, Isis, p. 994.

Larus ridibundus minor SCHLEGEL, 1844, 'Krit. Übers.-Europ. Vög.,' pp. cxxvii, 113.

Xema pallida HODGSON, 1844, in Gray's 'Zool. Misc.,' p. 86.

Chroicocephalus brunneicephalus GRAY, 1846, 'Cat. Hodgson Coll.,' p. 148, Nos. 566, 857.

MEASUREMENTS

MALES

	No. of Skins	Wing	Tail	Tarsus	Toe With- out Claw	Culmen	Bill at Base	Bill at Angle
<i>ridibundus</i> <i>sibiricus</i>	7	284-315 (300.0)	113-124 (117.5)	43-47 (44.7)	31-36 (33.3)	31-37 (33.6)	7.5-9.5 (8.8)	7.5-8.5 (8.1)
	11	305-325 (312.4)	121-133 (126.6)	43-49 (46.4)	33-37 (35.1)	34-39 (36.8)	9 -10.5 (9.7)	8.5-10 (9.3)

FEMALES

<i>ridibundus</i> <i>sibiricus</i>	5	280-297 (288.2)	104-117 (109.1)	42-47 (44.2)	31-33 (32.8)	30-33 (31.5)	8-8.5 (8.1)	7-8 (7.7)
	10	280-300 (290.0)	108-125 (116.9)	41-46 (43.4)	31-36 (32.6)	32-38 (34.0)	8-9 (8.4)	8-9 (8.3)

Larus cahiricus SAUNDERS, 1878, Proc. Zoöl. Soc. London, p. 201.

Larus cahirinus SAUNDERS, 1878, Proc. Zoöl. Soc. London, p. 201.

Chroicocephalus ridibundus lavrovi SARUDNY, 1912, 'Messenger Orn.,' (in Russian), III, p. 29.

Larus ridibundus sibiricus—Kamchatkan Black-headed Gull

Larus ridibundus var. *major* MIDDENDORF, 1853, 'Sibir. Reise, Zool.,' II, part 2, p. 244.

Larus ridibundus sibiricus BURTURLIN, 1911, 'Mess. Orn.,' (in Russian), II, p. 86 (Kolyma Delta and Ussuriland).

DISTRIBUTION

The geographical race *ridibundus* breeds in the British Isles, southern Scandinavia and central Europe east to Turkestan; in winter reaches the coasts of France, Portugal and northern Africa, the Red Sea, Persian Gulf, India and China and southern Japan; casual in Iceland, the Azores, Madeira and Canary Islands.

The race *sibiricus* breeds in extreme eastern Siberia; in winter reaches the coasts of Japan and China.

MOULTS AND PLUMAGES

Natal Down

REFERENCE SPECIMEN.—J. D., No. 50902; June 21, 1887; Hiddensee Island, Germany.

BACK, WINGS AND FLANKS tawny-olive, usually very ochraceous with heavy black spots and lines, a vertical dusky bar on the flanks and three bars across the wing. HEAD ochraceous with rather smaller spots in lines diverging from the bill and meeting on the occiput and throat. UNDERPARTS paler and unmarked except for a bar or spots on the sides and lower border of the chin; narrow malar stripes. BILL, in skin, flesh-brown. FEET, in skin, dusky flesh-brown. IRIS probably brown.

The ochraceous tone is striking and equalled by few species, but resembling in this respect *Xema sabini*.

Juvenal Plumage

Figures 327, 328 and 330

REFERENCE SPECIMENS.—H. F. Witherby, No. 579; ♀; July 23, 1913; Cromarty Firth, Scotland; down still partly adherent. Brit. M., 1911. 8.14.1., ♂; July 13, 1911; Dumfriesshire, Scotland; wings half grown. J. D., No. 42262; ♀; September 16, 1909; Romney Marsh, England; partly in winter plumage.

BACK AND MANTLE-AREA dark snuff or wood-brown with much paler edgings; rump gray fading to white upper tail-coverts. HEAD: the crown is mouse-gray, elsewhere grayish white except dusky nape, sides of neck, auriculars and eye-crescent; an indefinite white patch above the auriculars. UNDERPARTS white with a buffy breast band. WINGS: primaries pointed, dull black on margins and at tips (no apical spots) with long tongues of white along the shafts, the black increasing inward on

the inner webs, decreasing on the outer, the white becoming gray on outer webs from about the sixth or fifth; primary coverts dull black, often with partly gray or white inner webs; alula dusky with white basally and on outer webs; secondaries clove-brown, basally gray and with narrow gray edgings reducing the brown to subterminal patches on the inner quills; tertials brown like the back, more broadly edged; greater coverts gray very faintly tipped with pale buff; median and lesser coverts brown or dusky like the tertials with pale buff tips; marginal coverts chiefly gray; wing-lining and edge white. TAIL white with broad (15-25 mm.) dull black band narrowly buff-tipped, widest on three median pairs, diminishing slightly on the next two pairs and becoming on the distal pair a partial band or spot or a shaft-line, and sometimes this pair is wholly white. BILL dull orange to dull flesh, tip blackish (Witherby); in skin, flesh, or yellowish brown with dusky tip beyond nostril. LEGS AND FEET yellowish flesh, webs and joints dusky W.); in skin, yellowish flesh-brown. IRIS brown (W.); eyelids, in skin, black.

In some specimens the white of the two outer primaries develops only basally and distally with a dark area intervening producing partial elongated mirrors. Such birds are scarcely distinguishable from similar *maculipennis* from which they differ chiefly in lacking apical spots. *H. ridibundus* is the only small gull without apical spots at this stage except *atricilla* and species of the subgenus *Cirrhocephala*.

First Winter or Non-nuptial Plumage

REFERENCE SPECIMENS.—Brit. M., 85.7.24.8; September 25, 1890; Romney Marsh, England. J. D., No. 50906; November 6, 1892; Rye, England. J. D., No. 50911; December, 1906; Cremona, Italy. J. D., No. 50916; ♂; Yesso I., Japan.

Acquired by the postjuvenal moult, which is partial, in August and September.

BACK pallid neutral gray closely resembling the adult. HEAD much whiter than the juvenal, sometimes a slight dusky band across the occiput, the auricular spot and eye-crescent dull black; eye-ring posteriorly white, blending with adjacent white. UNDERPARTS white. WINGS AND TAIL of juvenal plumage retained. BILL AND OTHER SOFT PARTS like the juvenal.

First Nuptial Plumage

REFERENCE SPECIMEN.—J. D., No. 52909; ♂; August 1, 1922; Fleetwood, England; moulting into second winter but still retaining two old primaries and part of brown hood.

Acquired by a partial prenuptial moult, not including wings or tail, in March and April. Much like the first winter but the brown hood and white eye-ring are acquired in varying degree, some specimens almost like the adult, others either pale brown (the feathers often with white tips) or with a goodly mixture of white or grayish feathers; bill, legs and feet become reddish-tinged.

Second Winter or Non-nuptial Plumage (Adult)

Figures 329, 331 and 332

REFERENCE SPECIMENS.—J. D., No. 52863; ♂; October 19, 1921; Blackpool, England. Brit. M., 85.7.24.8; September 25, 1890; Romney Marsh, England.

Acquired by a complete postnuptial moult in July, August and September.

MANTLE pallid neutral gray to a little darker. HEAD largely white, neck gray veiled with dusky gray, a half-hood on occiput, auricular spot grayish black and eye-crescent deep black; eye-ring white posteriorly. UNDERPARTS white. WINGS: primary-pattern somewhat similar to juvenal but with much more white in longer, broader tongues, the black not running down on the outer webs to any extent, forming a band on fifth or fourth, a spot only on fourth or third, and the others wholly gray; small grayish apical spots beginning at fifth primary, larger inwards. White patch larger than juvenal including five outer primaries except tips and edge of tenth, alula, and all the small coverts including primary coverts. Secondaries gray to tips; tertials similar but paling to white tips; rest of upper coverts gray, except marginals white; lining and axillars gray. TAIL pure white. BILL, in skin, dull red, blackish towards tip. LEGS AND FEET dull reddish brown.

Some birds (a percentage difficult to estimate) fail to attain adult plumage and evidences of immaturity will be found at the usual places. especially among primary coverts which may be dusky in part.

Second Nuptial Plumage (Adult)

REFERENCE SPECIMEN.—J. D., No. 53059; ♂; April 8, 1920; Fleetwood, Lancashire, England.

Acquired by a partial prenuptial moult in March and April; wings and tail of winter retained.

Differs from the second winter only in acquiring the full brown hood which descends farther on the throat than on the nape and is decidedly darker in a sort of ring at the junction. There is a narrow white eye-ring posteriorly, and conspicuous eye-crescent.

BILL and gape crimson (Witherby); in skin, dull red slightly dusky beyond the angle. LEGS AND FEET crimson (W.) in skin, dull yellowish red. IRIS brown; eyelids crimson (W.).

SUMMARY

In adults the wing-pattern separates it from all gulls except *genëi* which has a longer bill and a white head both winter and summer. In the first year the wing-pattern usually suffices to distinguish *ridibundus* from all except *genëi* which has a longer bill.

In *sibiricus* the dimensions are greater than in *ridibundus*, especially the bill, and possibly it has more black on the primaries in both juvenals and adults.

Chroicocephalus genëi

Slender-billed Gull

Figures 333 to 338

Larus gelastes THIENEMANN AND BREHM, 1838, 'Syst. Darst. Fortpfl. Vög. Eur.,' V, p. 22.

Larus genei BRÈME, 1839, Rev. Zool., p. 321.

Larus leucocephalus BOISSONEAU, 1840, in 'Natterer's, Mündl. Mittheil.,' p. xcv.

Larus tenuirostris TEMMINCK, 1840, 'Man. d' Orn.,' 2d Ed., IV, p. 478.

Xema lambruschinii BONAPARTE, 1840, 'Icon. Fauna Ital.,' fol. 135, Pl. xlv.

Larus columbinus GALOWATSCHOW, 1854, Bull. Soc. Imp. Nat. Moscou, XXVII, part 2, p. 435, Pl. iv.

Gelastes rubriventris BONAPARTE, 1854, Naumannia, p. 216.

Larus subroseus and [*brehmi*] HEUGLIN, 1856, 'Syst. Uebers, Vög. N. O. Africa' (in Sitzungsber. Akad. Wien, XIX), pl. 69 (321).

Gelastes lichtensteinii BRUCH, 1857, Journ. für. Orn., p. 23.

Larus arabicus SAUNDERS, 1878, Proc. Zoöl. Soc. London, p. 193.

DISTRIBUTION

Breeding range, the Black, Azof and Caspian Seas, the Persian Gulf, the Mekran coast and eastern Persia and probably southern Spain; in winter throughout the Mediterranean, on the Atlantic coast of Africa (occasional to Senegal), the Red Sea and on the coasts of Persia and Baluchistan to Karachi, India.

MEASUREMENTS

	MALES (16)	FEMALES (8)
Wing	290-320 (304.0)	278-310 (293.4)
Tail	112-125 (117.4)	110-122 (113.7)
Tarsus	47- 54 (52.1)	46- 54 (48.6)
Toe without claw	34- 40 (36.8)	33- 38 (35.3)
Culmen	35- 46 (42.2)	37- 44 (40.1)
Bill at base	9- 11 (10.3)	8.5- 10 (9.6)
Bill at angle	9-10.5 (9.8)	8- 10 (9.2)

MOULTS AND PLUMAGES

Natal Down

REFERENCE SPECIMEN.—Brit. M., 98.2.2.645 (data lacking).

BACK, WINGS, AND FLANKS grayish white blotched or spotted with clear black. HEAD more buffy with similar black spotting, becoming transverse lines on the occiput. UNDERPARTS pale buffy white, paler than *ridibundus*. BILL, in skin, flesh-brown. LEGS AND FEET, in skin, dusky flesh-brown.

Juvenal Plumage

Figures 333 to 336

REFERENCE SPECIMEN.—Brit. M., 88.12.6.120; October 22, 1886; Fao, Persian Gulf; largely in the first winter plumage, the retained juvenal, much worn.

BACK AND MANTLE-AREA dark wood-brown, darkest on nape descending to sides, with paler edgings and gray basally; rump white. HEAD similar, browner, no auricular spot or only faintly gray. UNDERPARTS white. WINGS: primaries and coverts more or less white-patterned, with edges of the webs brownish black, a white patch occupying middle of wing where the white on the eighth and seventh and sixth passes over to outer webs; from the fifth inwards, slaty gray on the outer webs, the inner brownish black with narrowly white tips; secondaries gray with pale clove-brown outer edges or shaft areas, and broadly white-tipped; greater coverts pale gray, median pale clove-brown with whitish edgings, lesser, brown like back; lining of wing and alula clove-brown, white basally and on outer webs. TAIL white with dull black band (20 mm.), whitish tips, outer rectrix usually all white; some birds have a touch of brown on inner web or a shaft-blotch or both. BILL, LEGS, AND FEET, pale orange (Blanford).

All of the first year birds examined were well past the juvenal stage being badly worn.

First Winter or Non-nuptial Plumage

REFERENCE SPECIMEN.—Brit. M., 88.12.6.120; October 22, 1886; Fao, Persian Gulf.

Acquired by a partial postjuvenal moult in August, September, October, and even later.

BACK pallid neutral gray, sometimes brownish. HEAD pure white, no dusky gray on occiput as in *ridibundus* and only a faint gray auricular spot, very inconspicuous; eye-crescent dusky. WINGS AND TAIL of juvenal plumage retained. BILL AND OTHER SOFT PARTS like the juvenal.

First Nuptial Plumage

REFERENCE SPECIMENS.—Brit. M., 91.5.20.820; ♂; May 3; Karachi, Sind, India. U. S. N. M., No. 115488; ♂; April 2, 1888, Stagno di Cagliari, Italy.

Acquired by a partial prenuptial moult in the spring.

New gray grow among old gray on back and new white on the head and throat. Wings and tail of winter retained, the brown coverts of the wing becoming much faded and worn. Bill and other soft parts with a little of the adult colors.

Second Winter or Non-nuptial Plumage (Adult)

Figures 337 and 338

REFERENCE SPECIMEN.—Brit. M., 88.12.6.117; ♀; October 18, 1886; Fao, Persian Gulf; wings and body fresh-grown, tail not quite grown.

Acquired by a complete postnuptial moult in August and September, as late sometimes as October and November.

MANTLE pallid neutral gray. HEAD white with faint grayish auricular spot; eye-crescent black. UNDERPARTS white. WINGS more white in pattern than in juvenal plumage, outer primary with a black line on outer web not reaching the terminal

black, inner web usually with a border of black, but sometimes all white. TAIL white. BILL AND OTHER SOFT PARTS somewhat duller than the adult nuptial.

Specimens are in fairly fresh plumage in January, show wear in February, and in March, April and May the prenuptial moult takes place. May specimens show some new growth which is worn and faded in June and August birds (one August 18 showing as yet no postnuptial moult). Eighteen specimens examined have little or no black on inner web of tenth primary, fourteen specimens have more or less black; ten specimens have touch of black on outer web of the ninth primary, and fourteen specimens have white outer web and more or less black on the whole length of the inner web of the tenth primary. The ninth, eighth, and seventh primaries are white on outer webs, black on inner, the others gray both on outer and inner webs with blackish borders reaching tips on sixth and fifth, the others gray. Secondaries and all coverts neutral gray, tertials and alula paler, no wing band; edge of wing and axillars white, lining gray.

Second Nuptial Plumage (Adult)

REFERENCE SPECIMENS.—U. S. N. M., No. 103406; ♂; June 29, 1872; Knasil, Black Sea. J. D., No. 53159; ♀; March 6, 1892; Sardinia, Italy.

Acquired by a partial prenuptial moult in March, April and May; wings and tail of the winter plumage retained.

MANTLE, HEAD AND BREAST like old except that the auricular spot is lost, the head becoming wholly white and the white everywhere, even of wings, becoming more rosy. BILL red (Hartert); in skins, dusky brown with reddish tinge. LEGS AND FEET coral-red (H.); in skins, yellowish flesh-brown. IRIS yellowish white (H.); pale yellow, eyelids bright red (Hume).

SUMMARY

This species is a large *ridibundus* having the same wing-pattern and gray wing-lining but a white head instead of a hood. The bill is long and slender, proportioned a good deal like that of *ridibundus* but this is hardly a sufficient reason for recognizing the proposed monotypic genus *Gelastes*, because there are no other marked characters, except perhaps the head white at all seasons. The species was named after M. Gén   by the Marquis De Br  me.

Hydrocol  us philadelphia

Bonaparte's Gull

Plate XV; Figures 339 to 344

Sterna philadelphia ORD., 1815, in Guthrie's, 'Geog.,' 2d Am. Ed., II, p. 319. (near Philadelphia, Pennsylvania).

Larus marginatus RAFINESQUE, 1822, Kentucky Gazette, I, p. 3.

Larus minutus SABINE, J., 1823, App. Franklin's 'Polar Sea,' p. 696.

Larus capistratus BONAPARTE, 1827, 'Specchio Comp.,' p. 69.

Larus melanorhynchus TEMMINCK, 1830, Pl. Col. V, livr. 85, Pl. DIV.

Larus bonapartii SWAINSON AND RICHARDSON, 1832, 'Fauna Bor.-Am.,' II, p. 425, Pl. LXXII.

[*Chroicocephalus*] *subulirostris* BRUCH, 1853, Journ. für Orn., p. 105.

Larus philadelphicus TURNBULL, 1869, 'Birds E. Penn. and N. J.,' p. 38.

DISTRIBUTION

Breeding range, the Yukon Valley, Alaska, northern Mackenzie and northwestern British Columbia; winter range the coasts of the Gulf of Mexico, the Atlantic coast of the United States (seldom north of South Carolina) and the Pacific coasts of Mexico and the United States from Jalisco occasionally as far north as Oregon, and Washington; casual records for Peru, the Hawaiian and Bermuda Islands, the British Isles and Heligoland.

MEASUREMENTS

	MALES (15)	FEMALES (12)
Wing	255-271 (263.1)	246-265 (256.2)
Tail	99-108 (103.1)	99-106 (102.0)
Tarsus	34- 37 (35.3)	33- 37 (34.9)
Toe without claw	28- 32 (29.7)	28- 31 (29.3)
Culmen	27- 32 (29.9)	28- 31 (29.2)
Bill at base	6.5-7.5 (7.1)	6- 8 (6.8)
Bill at angle	6.5-7.5 (7.0)	6- 7 (6.5)

Natal Down

No specimen examined.

MOULTS AND PLUMAGES

Juvenal Plumage

Figures 339 to 341

REFERENCE SPECIMENS.—J. D., No. 7649; ♀; July 22, 1906; J. D., No. 7147; ♀; September 1, 1900; Tadousac, Quebec.

BACK AND MANTLE-AREA deep wood-brown, often reddish-tinged, the feathers basally gray and narrowly edged with pale buff, more broadly on the scapulars. HEAD deeper brown, crown-patch bordered by white that also forms narrow collar behind which the neck is like head and darker than the back; dusky auricular patch and black eye-crescent; eye-ring white. UNDERPARTS white save a faint buffy jugular band. WINGS: primaries all but outer two white-tipped, dull black with large areas of white on inner webs; secondaries gray with dusky areas on outer webs; larger areas on tertials, primary coverts and alula, the latter with blacker outer feathers, white or grayer inner ones; greater coverts clear gray, median clove-brown, paler wood-brown edged, sometimes partly with whitish edgings or pale brown, lesser coverts clear gray, marginals becoming white; edge and lining of wing white. The

median coverts form a dark band extending into the tertials. TAIL white with dull black terminal band, buffy tipped rectrices, outer pair usually banded, some partly, a few wholly white. BILL (see Pl. XV, fig. 5) "brownish black, vinaceous at base of mandible, gape salmon or pinkish" (Bishop); in skin, dull black, brownish flesh at base. LEGS AND FEET (see Pl. XV, fig. 5) "brownish drab or grayish vinaceous" (B.); in skin, dull reddish yellow-brown. IRIS (see Pl. XV, fig. 5) "warm sepia to seal-brown, eyelids black" (B.).

First Winter or Non-nuptial Plumage

REFERENCE SPECIMEN.—J. D., No. 685; ♀; November 27, 1884; Rehoboth Beach, Delaware.

Acquired by a partial postjuvenal moult in August and September.

BACK light, neutral, clear gray. HEAD pure white with dusky auricular spot of variable extent; black eye-crescent; usually a small inconspicuous gray patch on occiput sometimes extending laterally, eye-ring white the rim and posterior corner of eye dusky. UNDERPARTS white, no pectoral band. WINGS AND TAIL: juvenal plumage retained; the edgings fade whiter. BILL AND OTHER SOFT PARTS like the juvenal.

Similar specimens in November, December, January, February, March, April and up to May 11 (J. D., No. 45792; ♀; May 11, 1902; Long Island, New York).

First Nuptial Plumage

REFERENCE SPECIMEN.—J. D., No. 20222; ♀; May 5, 1907; Long Island, New York.

Acquired by a partial prenuptial moult in April and May; wings and tail of juvenal plumage still retained, often much worn. New gray feathers including tertials appear on back and an imperfect cap of dull grayish black is assumed, sometimes more advanced. Bill and other soft parts much like the juvenal; gape "rose to orange" (Bishop).

Second Winter or Non-nuptial Plumage (Adult)

Figures 342 to 344

REFERENCE SPECIMEN.—J. D., No. 45785; ♀; December 25, 1907; Long Island, New York; somewhat backward as there are a few dusky smudges on the tail and on shafts of the primary coverts.

MANTLE light neutral gray of adult. HEAD like first winter, dusky half-hood on occiput. UNDERPARTS like first winter, white. WINGS AND TAIL of winter retained. BILL "black, sometimes reddish-tinged base, gape coral-red or strawberry-pink" (Bishop); in skin, black. LEGS AND FEET "pinkish cream or vinaceous buff" (B.); flesh-color (Witherby); in skin, black. IRIS "Vandyke brown; eyelids black" (B.).

Second Nuptial Plumage (Adult)

REFERENCE SPECIMEN.—J. D., No. 16354; ♂; May 1, 1906; Okanagan, British Columbia.

Acquired by a partial prenuptial moult not including wings and tail,

in March and April. Differs from the second winter in acquiring a bluish black hood that includes the anterior parts of the head and throat, and from the first winter chiefly in the wings and tail of adult pattern. (see Pl. XV, fig. 6.)

BILL black, inside of mouth orange-vermilion (Witherby). LEGS AND FEET orange-vermilion (W.). IRIS brown, eyelids black (W.).

SUMMARY

A very small North American subarctic species distinguished in summer by a black hood with a blue-gray tone, a slender black bill and black and white wing-pattern identical with that of *ridibundus* and *genëi*. A peculiarity is the fact that the sexes are virtually of the same size, this species, *minutus* and perhaps *audouini* being the only three that show evidence of this.

Hydrocolæus minutus

Little Gull

Figures 345 to 350

Larus albus SCOPOLI, 1769, Hist. Nat., I, p. 80, No. 106.

Larus minutus PALLAS, 1776, 'Reise Prov. Russ. Reichs.,' III, p. 702 (Tobolsk, Siberia).

Larus atricilloides FALCK, 1786, 'Beytr. z. topog. Kenntn. Russ. Reichs,' III, p. 335, Pl. XXIV.

Larus d'orbignyi AUDOUIN, 1825, 'Hist. Nat. de l'Egypt,' Pl. ix, fig. 3.

Larus nigrotis LESSON, 1831, 'Traité d'Orn.,' p. 619.

Larus pygmæus GRAY, 1846, 'Gen. Birds,' III, p. 654.

DISTRIBUTION

Breeding range chiefly northern Russia, but extending in northern Asia and Europe from the Okhotsk Sea to the Baltic and North Seas chiefly between 55° and 65° N; winter range the Japan, Caspian, Black and Mediterranean Seas; casual in northern India, the Faroe Islands, England and Ireland, middle Europe, the Bermuda Islands, Mexico, New York and Maine.

MEASUREMENTS

	MALES (16)	FEMALES (9)
Wing	210-230 (220.5)	212-227 (220.5)
Tail	85- 95 (91.9)	89- 97 (91.8)
Tarsus	25- 28 (26.5)	25- 29 (26.5)
Toe without claw	22- 27 (24.5)	23- 26 (24.6)
Culmen	21- 25 (23.2)	22- 24 (23.3)
Bill at base	5.5-6.5 (6.0)	5- 6 (5.6)
Bill at angle	5- 6 (5.5)	5- 6 (5.4)

MOULTS AND PLUMAGES

Natal Down

No specimen examined. Clear brown, spotted and streaked with dark brown (Hartert).

Juvenal Plumage

Figures 345 to 346

REFERENCE SPECIMENS.—Brit. M. (Saunders, No. 1733); August; Aberdeen, Scotland. J. D., No. 52912; October 23, 1913; Burnham, Somerset, England.

BACK AND MANTLE-AREA dull black with broad white edgings, the feathers basally white, closely resembling *Xema*. HEAD and nape dull brownish black, with faint buff edgings extending to sides of neck; black eye-crescent, eyelids and auricular spot, lores and superciliary stripe white. UNDERPARTS white. WINGS: primaries, and their coverts dull black, pattern largely white on inner webs, from fifth inward, dark shafts and band at tips extending more or less along the outer web which is gray, the inner web and tip white, the fourth with a dusky shaft and only the outer web gray, the inner white, third to first similar, but with broader white tips; alula dusky with grayish edgings; secondaries white, dusky along shafts and sometimes gray on outer webs, leaving broad white tips; greater coverts gray with whitish or creamy edgings; median coverts dusky and edged like the back running into the dark tertials; lesser coverts mostly gray and partly dusky with shaft streaks; wing-lining and axillars white. TAIL white with broad terminal black band, 15–20 mm., on three median pairs of rectrices, the fourth about 5 mm. and the outer two pairs usually white or the next to outer slightly smudged. The extent of the black is variable on the outer pairs, the three median vary little in width of band which is nearly equal on all. BILL dark brown (Hartert); in skin, dusky brown. LEGS AND FEET flesh-colored (H.); in skin, yellowish flesh. IRIS dark brown (Witherby).

First Winter or Non-nuptial Plumage

REFERENCE SPECIMEN.—J. D., No. 14183; 1887, Nice, France.

Acquired by a partial postjuvenal moult in August and September.

MANTLE pale neutral gray. HEAD: white forehead, supraorbital stripe, crown and sides, the occiput uniformly dusky plumbeous, streaky where it joins crown and rather abruptly joining hind-neck which is the same color as the back; auricular spots and eye-crescent black. UNDERPARTS new white anteriorly and on sides. WINGS AND TAIL retained from juvenal.

First Nuptial Plumage

REFERENCE SPECIMEN.—Brit. M., 1916.2.30.245; August, 1893; Kent, England; worn, in postnuptial moult still retains a brown banded rectrix of the juvenal plumage.

Acquired by a partial prenuptial moult in March, April and May; wings and tail of juvenal plumage retained.

HEAD differs only in acquiring more or less of the black (or sometimes plumbeous) feathers of the cap, the nape is white instead of gray. BILL AND OTHER SOFT PARTS like the winter.

Second Winter or Non-nuptial Plumage (Adult)

Figures 347 to 350

REFERENCE SPECIMEN.—J. D., No. 14184; ♂; January 30, 1892; Calabria, Italy.

MANTLE pale neutral gray, like first winter. HEAD white except for a plumbeous gray area on occiput. UNDERPARTS white. WINGS: primaries and secondaries gray like mantle with broad (10–20 mm.) white tips, the inner webs dusky; wing-lining, plumbeous gray, the reversed coverts darker. In a small number of birds (the more backward, no doubt) the outer primary has the outer web black up to the white tip and an occasional bird also has dusky shaft lines and subterminal spots on the ninth to the sixth (see Fig. 347). These birds show no other evidences of immaturity and are so few in number (about one in five) that they cannot be the regular second year birds which no doubt are wholly gray, and virtually adult. TAIL white. BILL blackish (Witherby). FEET red-brown (W.). IRIS dark brown (W.).

Second Nuptial Plumage (Adult)

REFERENCE SPECIMENS.—J. D., No. 14187; ♀; April 14, 1896; Dobrudja, Rumania. Brit. M., 79.4.55; ♀; May 31, 1869; Lake Ladoga, Russia.

Acquired by a partial prenuptial moult in March, April and May; the wings and tail of winter retained.

Differs from second winter only in black hood, and in rosier tinge of under parts.

BILL red-brown; inside mouth orange (Witherby); in skin, black. LEGS AND FEET vermilion (W.); in skin, yellowish brown. IRIS dark brown (W.).

SUMMARY

The smallest of the gulls but with the characters of the others on a small scale. It has been placed by some systematists as if in a monotypic genus *Hydrocolæus* but it has characters which overlap those found in other species. The middle toe averages shorter than the tarsus, just as it does in most gulls, but in this small species with a shortened tarsus the proportionate length of the toe is a very poor generic character and other differences are slight. The dark gray primaries, white-tipped in adults, are peculiar to the species, but the wing-pattern and banded tail of first year birds is shared by others.

This species like *philadelphia* is exceptional in that the sexes are of the same size.

Subgenus SAUNDERSIA

Hydrocolæus saundersi

Saunders's Gull

Figures 351 to 356

Gavia kittlitzii SWINHOE, 1860, Ibis, p. 68.

Larus schimperi SCHLEGEL, 1863, Mus. Pay-Bas, Lari, p. 40.

Chroicocephalus saundersi SWINHOE, 1871, Proc. Zool. Soc. London, p. 273, colored Pl. XXI (Amoy, China).

DISTRIBUTION

Breeding range, the inland lakes of northern China; in winter descending to the coast of Korea and China, casual in Japan and Formosa.

MEASUREMENTS

	MALES (9)	FEMALES (6)
Wing	277-293 (283.7)	268-282 (275.3)
Tail	105-115 (109.5)	101-107 (104.0)
Tarsus	42- 44 (43.2)	39- 41 (40.5)
Toe without claw	24- 28 (26.0)	24- 26 (25.3)
Culmen	28- 29 (28.3)	23- 27 (25.2)
Bill at base	9.5- 11 (10.3)	8.5- 10 (9.4)
Bill at angle	9- 11 (10.0)	8-9.5 (8.9)

MOULTS AND PLUMAGES

Natal Down

No specimen examined.

Juvenal Plumage

Figures 351 and 352

REFERENCE SPECIMEN.—Brit. M. (Saunders, No. 3677); December, 1867; Amoy, China; largely in first winter plumage.

BACK AND MANTLE-AREA chiefly dull brownish gray or drab with clove-brown edgings. HEAD brownish drab with faint buff edgings, forehead and lores whiter; dusky auriculars and eye-crescent. UNDERPARTS white, a buffy wash on the throat. WINGS: primaries dull black with long tongues of white, chiefly on the outer webs of the two outer primaries, the others white with only a black tip (see Fig. 351), the fifth gray, banded at the tip, the fourth with a small spot on the outer web and fainter brown partial band on the inner, the third with a smaller spot and lacking the band, the second and first lacking both; secondaries gray with an elongated dusky spot on the outer webs, the gray paling to white tips; alula with gray outer, dusky inner webs; primary coverts largely gray, dusky at the base of the outer webs, lesser coverts brown; edge of wing white. TAIL white, narrowly banded with dull black. BILL black (Swinhoe), dull brown (Saunders); in skin, black, very slightly paler at the base of the lower mandible. LEGS AND FEET dark brownish red (Swinhoe); in skin, black. IRIS probably brown.

First Winter or Non-nuptial Plumage

REFERENCE SPECIMEN.—Brit. M., 1908.1.2.75; 1875; Swatow, China.

Acquired by a partial postjuvenal moult in the fall.

BACK neutral gray, often a little browner than the adult; rump and upper tail-coverts white. HEAD, forehead, crown, lores, and sides white, the occiput grayer and with dusky streakings obscured with whitish edgings; black auricular spot and eye-crescent. UNDERPARTS white with faintly dusky and buffy throat band. WINGS AND TAIL of juvenal plumage retained. BILL AND OTHER SOFT PARTS like the juvenal.

First Nuptial Plumage

No specimen examined.

Acquired doubtless by a partial prenuptial moult in the spring.

Except for the retained juvenal wings and tail, birds are probably virtually in adult plumage with black hoods, which however are often imperfect or brownish as in other hooded species.

Second Winter or Non-nuptial Plumage (Adult)

Figures 353 to 356

REFERENCE SPECIMENS.—Brit. M. (Saunders, No. 1735); ♂; November 24, 1867; Amoy, China. U. S. N. M., No. 103418; ♀; January 26, 1857; Amoy, China.

Acquired by a complete postnuptial moult in the fall.

MANTLE pale neutral gray, bluer rather than purplish. HEAD white, the occiput slightly obscured with dusky or plumbeous gray, darkest centrally along shafts of the feathers; auricular spot and eye-crescent black, a half eye-ring posteriorly white, lost in the adjacent white. UNDERPARTS white. WINGS: primaries largely white along shafts and outer webs except black line on outer web of tenth, with black inner webs that merge into subterminal bands on the ninth to sixth, the sixth sometimes white and banded or usually gray and partly banded with only a narrow border of black on the inner web, the fifth to first gray with whitish tips; secondaries largely white, other coverts gray, wing-lining pale gray, edge white. TAIL white. BILL black, (Swinhoe); in skin, black. LEGS AND FEET deep tile-red (S.); in skin, light reddish brown, dusky at joints. IRIS deep brown; eyelids black (S.); in skin, black.

There is considerable variation in the primary pattern. The outer web of the first primary may be wholly white, but more often with a black linear edging of variable extent on the basal half; the tip may be white, with or without a band on the inner web, or only a fleck or two. A white outer web occurs with either a wholly white or a half-banded tip, or the linear black on the outer web may occur with the same variations of the tip.

Second Nuptial Plumage (Adult)

REFERENCE SPECIMEN.—Brit. M. (Saunders, No. 3676); February 23, 1858; Amoy, China. (Type): prenuptial moult nearly completed; also several similar February and March specimens.

Acquired by a partial prenuptial moult in the late winter and early spring; wings and tail retained from winter.

BACK fresh gray but like the winter. HEAD acquires black hood, black eye-crescent; eye-ring, posterior half white; nape white. UNDERPARTS white. BILL AND OTHER SOFT PARTS brighter than in winter; bill with a ruddy tinge on lower mandible (Saunders).

SUMMARY

This species seems worthy of being placed in a monotypic subgenus as it has three good characters: (1) a very short, compressed and deep bill; (2) tarsus and toes extremely slender; and (3) the digital webs more deeply incised than any other gull. The wing-pattern is much like *bulleri* and resembles also *maculipennis* of the second year.

The characters, however, are those of other gulls, only somewhat more pronounced and differently grouped so that its relationship is better expressed by leaving it as a subgenus of *Hydrocolæus* rather than elevating it to full generic rank which it perhaps deserves.

RHODOSTETHIA

Rhodostethia rosea

Ross's Gull

Figures 357 to 362

Larus roseus MACGILLIVRAY, 1824, Mem. Wern. Soc., V, p. 249 (Melville Peninsula).

Larus rossii RICHARDSON, 1825, 'App. Parry's Second Voy.,' p. 359.

Larus richardsonii LESSON, 1837, 'Compl. Œuv. (Buffon),' IX, p. 516.

DISTRIBUTION

Circumpolar, the breeding localities few and far north, in western Greenland (Disko, Ekomnit), probably in the Canadian Arctic archipelago, in northern Siberia north of about Lat. 67° N. and from about Long. 145° to 155° E. (Indigirka and Kolyma river basins), in Spitzbergen and probably other Arctic islands; winter range far north and not well known; casual in the Faroe Islands, England, France, Italy Norway, and Heligoland Island.

MEASUREMENTS

	MALES (7)	FEMALES (4)
Wing	248-265 (255.1)	252-260 (256.0)
Tail	121-138 (125.3)	123-128 (125.2)
Tarsus	30- 33 (32.1)	31- 33 (32.2)
Toe without claw	24- 27 (25.7)	24- 26 (25.2)
Culmen	18- 20 (19.3)	18- 20 (19.2)
Bill at base	5.5-6.5 (6.1)	6-6.5 (6.1)
Bill at angle	5.5-6.5 (6.1)	6-6.5 (6.1)

MOULTS AND PLUMAGES

Natal Down

No specimen seen. Ground color dusky yellow (pale sulphur-yellow to burnt wood-yellow, occasionally with a rusty tinge), this densely covered with numerous

blackish gray markings, pale and ill-defined on flanks and nearly black on head, the abdomen and median portion of breast immaculate whitish; the pattern of markings for the most part with longitudinal tendency, transverse on nape and cuneate on crown (Buturlin, *Ibis*, 1906, p. 334).

Juvenal Plumage

Figures 357 to 360

REFERENCE SPECIMEN.—J. D., No. 44071; ♂; September 20, 1915; Point Barrow, Alaska; largely in first winter plumage.

BACK AND MANTLE-AREA dull brownish black with rather narrow pale buff edgings; feathers basally grayish white. HEAD: crown and neck similar to back, forehead, lores and sides of head dull white; eye-crescent and auriculars black. UNDERPARTS white, slightly dusky markings on upper throat and at sides of throat. WINGS: primaries dull black, the outer two or three with inner webs half white, the proximal quills only tipped with black diminishing from a terminal band on the fifth to a spot or broken band on the third with the second and first wholly white; secondaries white, except black areas on two or three proximal; tertials dull black like the back and with the similar median and lesser coverts forming a dark band, between the grayish white greater and the lesser coverts; primary coverts and alula dull black, wing-lining white, edge slightly dusky in scallops; axillars grayish white. TAIL white with broad dull black terminal band measuring about 30 mm. on the median elongated pair of rectrices, diminished to 15 mm. on third pair, the fourth and fifth scarcely smudged and the distal pair practically white with a smudge on inner webs. BILL black, brownish at base (Witherby); in skin, black. LEGS AND FEET dull fleshy purple (Nelson); in skin, brownish flesh. IRIS brown (N.); "black" (*ex* label).

First Winter or Non-nuptial Plumage

REFERENCE SPECIMEN.—Brit. M., 88.10.10.3509; ♂; September 25, 1882; Point Barrow, Alaska. L. C. Sanford, No. 3525; ♂; September 23, 1914; Point Barrow, Alaska.

Acquired by a partial postjuvenal moult in August and September.

BACK pale neutral gray, possibly paler than in the adult. HEAD AND NECK white with bluish gray veiling on the crown and hind-neck, auricular spot, and eye-crescent black, extending into a scattering of black feathers chiefly below and before the eye. UNDERPARTS white with a faint rosy tinge. WINGS AND TAIL of the juvenal plumage retained. BILL AND OTHER SOFT PARTS practically like the juvenal.

First Nuptial Plumage

No specimen seen.

Acquired doubtless by a partial prenuptial moult in the spring; wings and tail of the juvenal stage are retained. Probably differs from the first winter only in assuming an entirely white head and a narrow black, often imperfect, collar; the throat and breast probably become more rosy tinged, Bill and other soft parts probably little different from the winter.

Second Winter or Non-nuptial Plumage (Adult)

Figures 361 and 362

REFERENCE SPECIMEN.—J. D., No. 50066; ♂; September 20, 1915; Point Barrow, Alaska; a very few old worn feathers remain on edge of wing and among the lesser coverts.

MANTLE pale neutral gray. HEAD AND NECK white, crown, head and neck veiled with pale bluish gray. UNDERPARTS white with a decidedly rosy tinge, most marked on breast. WINGS: primaries wholly gray like mantle except for the black outer web of the tenth; broad white tips of the secondaries form a wing-band; axillars white, lining gray like mantle. BILL black. LEGS AND FEET red, of various shades from coral to orange, according to different authors; in skin, flesh-brown. IRIS dark brown (Dresser).

Second Nuptial Plumage (Adult)

REFERENCE SPECIMEN.—L. C. Sanford, No. 3518; ♂; May 15, 1907; Anadyr Bay, Siberia.

Acquired by a partial prenuptial moult in the spring; wings and tail of winter retained.

Like the winter except for new white head with narrow black collar and rosier white underparts.

BILL black, gape and eyelid vermilion (Witherby). LEGS AND FEET orange-red (W.).

SUMMARY

Rhodostethia rosea is a small gull, of Arctic distribution in the monotypic genus *Rhodostethia* which can always be recognized by its unique cuneate tail. The gray unpatterned wing of the adult, while unique among gulls, suggests that of *minutus* and the juvenal wings and tail in pattern both resemble that species, the black and white being pronounced, without the brownness so often present in other juvenal gulls. The black ring or collar without hood is a plumage character not found in any other species although indicated in species like *brunneicephalus* and others by a darkening at the margin of the hood or more distinctly a collar as in *Xema*.

RISSA

KEY TO SPECIES AND SUBSPECIES OF *Rissa*

a.—Tail white.

b.—Mantle dark gray, culmen shorter (26–30 mm.), tarsus, in life, crimson.

c.—Black spots on hind neck and cubital coverts.....*brevirostris* juv.

cc.—No spots.....*brevirostris*.

bb.—Mantle pale gray, culmen longer (33–40 mm.), tarsus, in life, black.

c.—Smaller, less black on primaries, claw of rudimentary hind toe usually absent.....*tridactyla tridactyla*.

cc.—Larger, more black on primaries, claw of hind toe often present.

tridactyla pollicaris.

aa.—Tail banded.

b.—Larger, and paler mantle, claw of rudimentary hind toe usually absent.

tridactyla tridactyla, juv.

bb.—Smaller, and darker mantle, claw of hind toe usually present.

tridactyla pollicaris, juv.

Rissa tridactyla

Plate XIV; Figures 363 to 368

Rissa tridactyla tridactyla—Atlantic Kittiwake

[*Larus*] *tridactylus* LINNÆUS, 1758, 'Syst. Nat.,' 10th Ed., I, p. 136 (Great Britain).

[*Larus*] *rissa* BRÜNNICH, 1764, 'Orn. Bor.,' p. 42.

[*Larus*] *naevius* LINNÆUS, 1766, 'Syst. Nat.,' 12th Ed., I, p. 225.

Larus albus MÜLLER, 1776, 'Natursyst.,' Suppl., p. 108.

Larus cinerarius FABRICIUS, 1780, 'Fauna Groenl.,' p. 101.

[*Larus*] *riga* GMELIN, 1789, 'Syst. Nat.,' I, part 2, p. 594.

Larus torquatus PALLAS, 1826, 'Zoog. Rosso-Asiat.,' II, p. 328.

Larus gavia PALLAS, 1826, 'Zoog. Rosso-Asiat.,' II, p. 329.

Rissa brünnichii STEVENS, 1826, in Shaw's 'Gen. Zool.,' XIII, part 1, p. 181, Pl. XXI.

Laroides minor BREHM, 1831, 'Vög. Deutschl.,' p. 756.

Rissa cinerea EYTON, 1836, 'Cat. Brit. Birds,' p. 52.

Rissa brachyrhynchus BRUCH, 1853, Journ. für Orn., p. 103.

Rissa niveus BRUCH, 1855, Journ. für Orn., p. 285.

Rissa borealis BREHM, 1855, 'Vogelf.,' p. 341.

Rissa gregaria BREHM, 1855, 'Vogelf.,' p. 341.

Rissa tridactyla pollicaris—Pacific Kittiwake

Larus ryssa PALLAS, 1769, 'Spicil. Zool.,' V, p. 28.

Larus tridactylus KITTLITZ, 1832, Isis, p. 1104.

Rissa brachyrhyncha TACZANOWSKI, 1876, Bull. Soc. Zool. France, p. 264.

Rissa nivea BONAPARTE, 1854, Naumannia, p. 212.

[*Rissa*] *kotzebui* BONAPARTE, 1857, 'Consp. Av.,' II, p. 226.

[*Rissa tridactyla*] *b. pollicaris* BAIRD, BREWER AND RIDGWAY, 1884, 'Water Birds N. Amer.,' II, p. 202 (no type locality).

Rissa brevirostris LAWRENCE, 1858, in Baird, 'Rep. Pacific R.R. Surv.,' IX, p. 855, part.

Larus canus LINTON, 1907, Condor, IX, p. 110.

DISTRIBUTION

The race *tridactyla* is nearly circumpolar in Arctic and subarctic portions of North America, Europe and Asia; the breeding range extends eastward from Alaska over the Canadian Arctic archipelago to Greenland, Jan Mayen, Franz Joseph, Spitzbergen, Nova Zembla and other Arctic islands, also to northern coast of Siberia, reaching its southern

MEASUREMENTS

MALES

	No. of Skins	Wing	Tail	Tarsus	Toe With- out Claw	Culmen	Bill at Base	Bill at Angle
<i>Rissa tridactyla pollicaris</i>	12	295-322 (305.1)	124-136 (128.5)	32-36 (33.6)	36-40 (38.1)	33-39 (35.7)	12-13 (12.5)	10.5-11.5 (11.0)
	7	301-320 (309.6)	121-136 (129.4)	32-35 (33.7)	37-40 (38.4)	34-40 (37.9)	10.5-13 (12.1)	10 -12 (11.0)

FEMALES

<i>Rissa tridactyla pollicaris</i>	10	285-314 (297.9)	113-140 (122.9)	31-34 (32.6)	36-39 (37.3)	31-36 (33.6)	11-13 (11.6)	10-12 (10.7)
	5	295-308 (302.2)	120-133 (128.2)	31-33 (32.0)	35-39 (37.6)	34-39 (36.8)	11-12 (11.2)	10-11 (10.2)

limits at the Gulf of St. Lawrence, the British Isles (formerly nesting on the Scilly Islands) and Norway; the winter range covers the Atlantic coasts of the United States, Europe and Africa and the Mediterranean, Black and Caspian Seas, occasionally reaching Bermuda and the Cape Verde Islands; many casual records for the inland United States.

The breeding range of *pollicaris* includes some of the islands and coasts of Bering Sea south to the Aleutian and Commander Islands and to Cook Inlet, Alaska, and parts of the Arctic coast from Point Barrow, Alaska to Chaun Bay, Siberia; in winter found along the Pacific coast of North America south to California, and Lower California (San Geronimo Island) and to the coasts of the Kurile Islands and Japan.

MOULTS AND PLUMAGES

Natal Down

REFERENCE SPECIMENS.—A. M. N. H., No. 70205; July 26, 1898; Bird Rock, Gulf of St. Lawrence. J. D., No. 8303; ♂; August 1, 1897; Point Barrow, Alaska.

BACK and flanks pale grayish buff and pale clove-brown mixed so as to give a freckled or finely mottled effect. HEAD creamy white and unmarked in sharp contrast to the back; nape and sides of neck buff; eyelids form a narrow black ring. UNDERPARTS and wings white (humeral area of wings, buff) unmarked. BILL, in skin, dull black, flesh-brown at base and extreme tip. LEGS AND FEET blackish brown. IRIS brown(*ex* label).

Juvenal Plumage

Figures 363 and 364

REFERENCE SPECIMENS.—J. D., No. 21090; ♂; August 12, 1890; Davis Straits, Greenland. A. M. N. H., No. 70211; July 26, 1898; Bird Rock, Gulf of St. Lawrence; down still adherent at many points.

BACK AND MANTLE-AREA clear neutral gray sometimes slightly browner than in the adult and sometimes with faint whitish edgings; rump gray, sometimes freckled with black; upper tail-coverts white. HEAD white or washed faintly with gray, a darker bluer gray band across the occiput next to a broad black collar descending to the sides of the throat and a narrow white area behind the collar blending into the gray of the back; auricular spot, eye-crescent and rim of eye-ring black, the posterior half of eye-ring broadly white. The feathers are basally white and those of the collar merely tipped with black. UNDERPARTS white. WINGS: primaries dull black with tongues of white occupying half of the inner webs, usually up to sixth which has grayish white on both webs, the tip black-barred with a small white apical spot, the fifth less white except for partial bar often broken up into one or two dark spots, the others pale neutral gray with white tips; primary coverts dull black with gray on the inner webs, the proximal feathers tipped or almost wholly gray; secondaries pale neutral gray merging into broad white edgings and tips; greater and median coverts a much deeper gray, like the back, with whitish edgings; lesser coverts, especially marginals, and "shoulders" dull black forming a black band extending into the outer gray-edged webs of the tertials which are white on the inner webs; wing-lining, edge, and

axillars white extending to upper surface of the wing beneath the alula which is black. TAIL slightly forked (sometimes 10–15 mm.), white with a wide, 15–20 mm. dull black band of even width on four median pairs of retrices, narrower on fifth and only just touching the outer pair on the inner webs and frequently leaving them white. BILL black (Witherby); in skin, brownish black. LEGS AND FEET brown (W.); in skin, blackish brown. IRIS dark brown (W.).

First Winter or Non-nuptial Plumage

REFERENCE SPECIMENS.—J. D., No. 8912; ♂; August 26, 1902; Tadousac, Quebec, Canada. J. D., No. 17547; ♂; November 18, 1898; Douglas, Wyoming.

Acquired by a partial postjuvenal moult in August, September and October.

BACK neutral gray, usually lacking the white edgings of the juvenal, but often indistinguishable. HEAD whiter than the juvenal and veiled with gray, posteriorly the occipital band a bluer gray and the dusky markings about the head grayer; the black collar is partly or wholly replaced. UNDERPARTS white, mid-abdomen duller where the worn juvenal is retained. WINGS AND TAIL of the juvenal plumage retained. BILL, LEGS, FEET, AND IRIS practically like the juvenal.

First Nuptial Plumage

REFERENCE SPECIMEN.—A. M. N. H., No. 60527; ♂; March 17, 1894; Montauk Point, Long Island, New York.

Acquired by a partial prenuptial moult in March and April. Wings and tail of juvenal stage retained.

Much like the winter, the head partly white but veiled with gray, the black collar band usually replaced by gray or it is partly black in backward birds. BILL in skins, greenish yellow with irregular dusky clouding which diminishes until lost at the extreme tip. LEGS AND FEET "black" (*ex label*). IRIS "brown" (*ex label*).

The early postnuptial moult of first year birds (which is not confined to this species), especially those backward in development, is illustrated by the following specimens: J. D., No. 3772, ♀, June 9, 1894, Sable Island, Nova Scotia; J. D., No. 20813, ♀, June 9, 1901, Queen Charlotte Islands, British Columbia; J. D., No. 29838, ♂, May 24, 1910, Dutch Harbor, Alaska; all of these birds moulting the primaries, the last with only four old primaries left at this unusually early date.

Second Winter or Non-nuptial Plumage (Adult)

Figures 365 to 368

REFERENCE SPECIMEN.—J. D., No. 2366; ♂; August 12, 1889; Tadousac, Quebec.

Acquired by a complete postnuptial moult sometimes beginning (probably in backward birds) in May or June, but the peak is regularly in August or a little later.

MANTLE neutral gray. HEAD white on the forehead merging into dark bluish gray on the occiput with an ill-defined half-collar, the neck veiled with paler gray, the grays deeper than in the first winter; auriculars bluish dusky gray and eye-crescent less extensive than in first winter. UNDERPARTS white. WINGS: primary-pattern white or very pale gray with terminal black on three or four distal quills, as if they had been dipped into ink, the sixth usually with a broken band or spot, the outer web of the tenth also black (in backward birds, webs of ninth and eighth in part), the fifth to first gray, broadly white-tipped in contrast; primary coverts gray, the distal usually with a dusky outer web; secondaries gray, white-tipped; all rest of wings gray. TAIL white, less emarginate than in the first winter. BILL (see Pl. XIV, fig. 6), in skin, pale greenish yellow, tip sometimes dusky; "mouth orange-red in life" (*ex* label). LEGS AND FEET (see Pl. XIV, fig. 6), in skin, brownish black. IRIS (see Pl. XV, fig. 6) dark brown, "eyelids orange-red" (*ex* label).

Owing to the size of this gull, it would be expected that a good many second year birds would fail to attain fully adult plumage, and yet the proportions of such birds is apparently not large. It seems to have a two-year cycle.

Second Nuptial Plumage (Adult)

REFERENCE SPECIMENS.—J. D., No. 43561; ♂; May 12, 1913; Godthaab, Greenland. A. M. N. H., No. 156602; ♂; June 5, 1916; Etah, Greenland.

Acquired by a partial prenuptial moult in March and April, the winter wings and tail retained. A pure white head and neck is assumed; without the gray veiling and auricular spots of the winter plumage; partial, conspicuous white eye-ring.

A bird (Point Barrow, Alaska, August 15) is in postnuptial moult with four old primaries left, and is of the backward type, the black color extending on the outer webs of the ninth and eighth primaries and part of the inner webs of the tenth and ninth; some of the outer primary coverts, smaller coverts and the alula are smudged on the outer webs with dull black.

SUMMARY

The genus *Rissa* was founded on the lack of a hind toe or hallux which is rudimentary and often reduced to a fleshy lump that varies from a mere elevation or knob of the skin to an elongation that may or may not be furnished with a more or less rudimentary claw. The Pacific race *pollicaris* was separated chiefly on the more frequent presence of a toe with a claw, for a rudimentary (very seldom a complete) claw is to be found in about fifty per cent of *pollicaris*, and in only about ten per cent of *tridactyla*.

A series of over a hundred birds examined gives the following results: *tridactyla*, 88 specimens without claw, 8 specimens with claw; *pollicaris*, 20 specimens without claw, 11 specimens with claw.

The race *pollicaris* has also other good differences: it is larger, especially the bill, has a somewhat darker mantle with the black more extended on the primaries, and there is, as a rule, one more of them banded or spotted than in *tridactyla*; that is, in *tridactyla* usually five primaries are tipped with black, in *pollicaris* six. Subjoined measurements show the greater amount of terminal black in *pollicaris*; measured along the shaft of the tenth primary of the right wing the length of the black tip in adults is as follows (see Figs. 367 and 368):

<i>tridactyla</i>	23	adults	54-75 (64.3) mm.
<i>pollicaris</i>	28	adults	64-92 (72.9) mm.

Chapman (1899) discusses, at length, plumage and relationships of the species.

The wing-pattern of *tridactyla* is diagnostic. It is as if the tips of the primaries had been dipped into ink, resembling the first nuptial plumage of *pipixcan* but lacking the apical spots. *Rissa brevirostris* has the same pattern but the tongues and tips are gray. The race *pollicaris* is a large *tridactyla*, the primaries in the adult as if dipped deeper into ink, the mantle darker, and the hind toe more elongated and more often with a claw which, however, is usually rudimentary and buried in the skin, seldom perfect.

Rissa resembles *canus* in color of the bill and lack of hood but, on account of the emarginate or slightly forked tail, the extremely short tarsus, and the wing pattern, it seems to belong among those members of the *Hydrocolæus* group that stands near to the terns. It appears to have a two-year plumage-cycle although a good many specimens show signs of immaturity in their second year.

Rissa brevirostris

Red-legged Kittiwake

Figures 369 to 372

Larus brachyrhynchus GOULD, 1843, Proc. Zoöl. Soc. London, p. 106.

Rissa nivea GRAY, 1844, 'List Birds Brit. Mus.,' 'Anseres,' p. 174.

[*Larus*] *brevirostris* BRUCH, 1853, Journ. für Orn., p. 103 (northwest coast of America).

[*Rissa*] *kotzebuii* BONAPARTE, 1854, Naumannia, p. 212.

[*Laroides*] *citrirostris* BRUCH, 1855, Journ. für Orn., p. 284.

Larus warnecki COINDE, 1860, Rev. et Mag. de Zool., p. 401.

DISTRIBUTION

Breeding range the Pribilof, western Aleutian, Commander and probably other islands of Bering Sea. Winter range practically unknown; casual at St. Michaels, Alaska, and at Forty Mile, Yukon.

MEASUREMENTS

	MALES (5)	FEMALES (7)
Wing	299-310 (305.4)	290-305 (298.0)
Tail	124-132 (128.8)	116-128 (123.3)
Tarsus	30-32 (31.0)	29- 31 (30.0)
Toe without claw	38- 39 (38.6)	37- 40 (38.6)
Culmen	27- 30 (28.6)	26- 30 (28.9)
Bill at base	11- 12 (11.5)	11- 12 (11.8)
Bill at angle	10- 11 (10.7)	10.5- 11 (10.9)

Natal Down

MOULTS AND PLUMAGES

Not seen. Said to be identical in coloration with the same stage of *Rissa tridactyla* (Ridgway, 1919).

Juvenal Plumage

Figures 369 and 370

REFERENCE SPECIMENS.—Brit. M. (Saunders, No. 3935) [=U. S. N. M., No. 68388]; Walrus Island, Pribilof Islands, Alaska; tail half grown. A. M. N. H., No. 161510; Walrus Island.

MANTLE plain neutral gray, a trifle browner than when adult. HEAD white with a black spotted, less extensive collar than in *tridactyla* that reaches sides of the neck, the basally white feathers barely tipped with dull blackish bars; auriculars and eye-crescent black. UNDERPARTS white. WINGS: primaries dull black with grayish-white tongues on half or more of inner webs nearly to tips, the sixth gray on outer web, the black reduced to a subterminal bar, the fifth similar but with only a subterminal spot on outer web, the others gray with broad white tips and inner webs; primary coverts and alula dull black, gray on inner webs, inner proximal quills wholly gray, edge of wing gray with some dusky edgings, lining and axillars white; secondaries white, inner gray-edged; greater coverts gray like back, white-tipped; median and lesser gray, whitish edged running to outer webs of tertials; a few dusky-tipped lesser coverts at "bend of the wing." TAIL white; the only species of gull that has a pure white tail in the juvenal plumage. BILL, in skin, black, brownish at base of mandible. LEGS AND FEET, in skin, dusky brownish flesh.

First Winter or Non-nuptial Plumage

No specimen seen.

Acquired no doubt by a postnuptial moult in August and September.

BACK is probably deep neutral gray like adult. HEAD, NECK AND BREAST white like the juvenal, the spotted collar lost or much diminished, and the rest of plumage including wings and tail retained from the juvenal.

First Nuptial Plumage

No specimen seen.

Acquired by a partial prenuptial moult in spring. Probably hardly differs from the first winter.

Second Winter or Non-nuptial Plumage (Adult)

No specimen seen

Acquired by a complete postnuptial moult probably in August and September.

Probably like the nuptial plumage except for a bluish wash on the occiput and dusky auriculars.

Some birds show black extending to the inner web of first primary and also on the second, indicating immaturity, and the primary coverts may or may not have dusky markings, but with small series it is difficult to say what proportion of birds fail to attain fully adult plumage at this stage. There seems to be a two-year plumage-cycle.

Second Nuptial Plumage (Adult)

Figures 370 to 372

REFERENCE SPECIMENS.—J. D., No. 48557; ♂; May 27, 1917; St. George Island, Pribilof Islands, Bering Sea. A. M. N. H. No. 61507; ♀; July 1, 1873; St. George Island.

MANTLE deep neutral gray. HEAD AND NECK white. UNDERPARTS white. WINGS: primaries gray basally, the outer five broadly tipped with black (as if dipped into ink) that becomes a subterminal band or spot at fifth and sixth, the others gray, broadly white-tipped; primary coverts gray, the outer sometimes with dusky shaft streaks, secondaries gray, tipped with white; tertials and lesser coverts like mantle; wing-lining gray, reversed coverts darker. TAIL white. BILL, in skin, pale yellow. LEGS AND FEET, in skin, yellowish flesh-brown, or reddish.

Like the winter except that the head becomes pure white with vermilion eyelids. The throat and head are new, but the wings and tail of the second winter are retained. Bill becomes bright or chrome-yellow, slightly tinged with greenish terminally; gape and inside of mouth orange-red or vermilion (in life); legs and feet vermilion-red (Ridgway); in skin, yellowish red.

SUMMARY

Rissa brevirostris, a rare species of local distribution in Bering Sea, might well be placed in a monotypic genus if only the bill short, stout and sharply decurved at the tip, is considered. The similarity to *Rissa tridactyla* is, however, striking when we also take into consideration the hind toe, the short tarsus, and the wing-pattern. The minute hallux has a fairly distinct claw in 9 out of 15 specimens examined and the wing-pattern shows a deep plumbeous gray like the mantle, where *tridactyla* shows white. The juvenal tail is unique among the gulls, being pure white without a band or spots, and the conspicuous juvenal black collar and wing-bands of *tridactyla* are represented by a few spots of black.

CREAGRUS

Creagrus furcatus

Swallow-tailed Gull

Figures 373 to 378

Larus furcatus NÉBOUX, 1840, Rev. Zool., p. 290 (probably not "Monterey").¹

DISTRIBUTION

Resident on the Galapagos Islands, breeding on some and then wandering to others; casual at Malpelo Island (Bay of Panama), and on the coast of Peru, also Paracas Bay.

MEASUREMENTS

	MALES (8)	FEMALES (8)
Wing	405-433 (414.8)	393-414 (404.1)
Tail	184-202 (191.1)	181-197 (189.7)
Tarsus	45- 55 (52.1)	47- 54 (51.0)
Toe without claw	44- 52 (48.5)	44- 50 (47.1)
Culmen	47- 55 (52.0)	49- 52 (50.9)
Bill at base	15- 18 (17.3)	15-17.5 (16.0)
Bill at angle	13- 15 (13.9)	12- 13 (12.8)

MOULTS AND PLUMAGES

Natal Down

Not seen.

Chicks have been found in January and February on Hood Island.

Juvenal Plumage

Figures 373 and 374

REFERENCE SPECIMEN.—Brit. M. (Saunders, No. 348); ♂; October, 1881; Paracas Bay, Peru.

BACK AND MANTLE-AREA clove-brown with broad white edgings, the feathers of back largely white basally with subterminal irregular bars; rump and upper tail-coverts grayish marked with brown. HEAD white, pale brown edgings on occiput, neck becoming gradually pale clove-brown and merging into darker back; auriculars and eye-crescent dusky to black, lores partly brown. UNDERPARTS white. WINGS: primaries pointed, dull black with white tongues covering nearly all of the inner webs, the terminal black areas somewhat larger than in adults; secondaries and alula white, the greater coverts with pale gray edgings, and the median, darker gray merging into similar tertials; primary coverts dull black; lesser coverts brown like the back, similarly white edged. TAIL white with terminal dull black band (20-30 mm. in width), the rectrices narrowly white-tipped, the outer pair with only one or two slight smudges or spots. BILL, in skin, dull black, lower mandible at base brownish flesh. FEET "grayish white" (*ex* label); in skin, very pale brownish flesh. IRIS brown (*ex* label).

¹The staff of the 'Venus' collected at the Galapagos Islands as well as at Monterey, California, and there is probably a confusion of labels.

First Winter or Non-nuptial Plumage

No specimen seen.

Acquired by a partial postjuvenal moult, probably chiefly in the fall. No doubt the new plumage of the back and neck is largely gray, the head white with dusky auriculars and eye-ring; the juvenal wings and tail are retained.

First Nuptial Plumage

No specimen seen.

Acquired by a partial prenuptial moult no doubt in the spring when a partial hood is acquired. Wings and tail of juvenal plumage retained.

Second Winter or Non-nuptial Plumage (Adult)

Figures 375 to 378

REFERENCE SPECIMENS.—B.-S., No. 498; ♀; June 28, 1913; 10 miles off Pisco Bay, Peru; first primary not fully grown; tail new, not fully grown; body plumage mostly new. B.-S., No. 497; ♀; same date and place; two old primaries remaining, new tail white except spot on outer rectrix and a shaft-streak.

Acquired by a complete postnuptial moult beginning as early as June, usually much later.

MANTLE neutral gray, wing coverts darker, the scapulars and tertials with narrow white edgings that border the actual back with a white line; rump darker gray, upper tail-coverts abruptly white. HEAD pure white, obscurely streaked on the occiput with gray which passes into an ill-defined collar contrasting with the paler neck; slight auricular spot dusky; the eye surrounded with a broad (4–5 mm.), grayish-black eye-ring, giving the effect of goggles. UNDERPARTS white, clouded with pale gray on the throat, the sides of the throat markedly gray. WINGS: primary pattern is like the juvenal except that the white is more extensive and there is more gray occupying both webs largely inward from the eighth or seventh which have apical spots, from the fourth to the first wholly white or gray; primary coverts dusky inner webs gray to white outer webs; secondaries pale gray becoming white on the proximals; tertials gray, not white-tipped but narrowly edged with white; greater and median coverts, grayish edged, paling to white. TAIL white. BILL "black, tip bluish" (*ex label*); in skin, black, tip beyond nostril soapstone-color. LEGS AND FEET "red," "dull reddish ochre, feet decidedly red" (*ex label*). IRIS "brown" (*ex label*).

The species appears to have a two-year plumage-cycle, but the rather limited material at my disposal does not enable me to determine definitely how large a proportion of birds attain adult plumage at this stage. Some show evidences of immaturity in the dusky primaries coverts and this may prove to be the usual second year marking because the species is of so large a size.

The idea is current that the dark hood is worn throughout the year. This is not the case, and the confusion has arisen because, although the

breeding season is said to cover about eight months, the actual periods for different colonies are no doubt much shorter, and in this way the apparent discrepancies in moult and plumage may be explained. It is evident from specimens that a hood belongs to the breeding season and a white head to the non-breeding.

The species has been recorded as breeding in July on Wenman and Culpepper, in October on Tower, and in December on Hood Island (Rothschild and Hartert).

Second Nuptial Plumage (Adult)

REFERENCE SPECIMEN.—M. C. Z. (Bangs, No. 1715); ♂; February 11, 1901; Wenman Island, Galapagos.

Acquired by a partial prenuptial moult as early as February and as late as May as specimens indicate.

Only the head, back, throat and breast and a few feathers elsewhere are new, the second winter wings and tail being retained. The dusky hood replaces a white head, otherwise the new feathers are like the old, but the throat and breast are usually rosy.

BILL gray pea-green; rictus crimson; skin in interramal space salmon-colored; orbital ring crimson; iris dark brown; tarsus and toes peach-blossom pink; webs geranium-pink shaded with black at edges (Gifford).

SUMMARY

Creagrus furcatus, a local species of the Galapagos Islands, certainly deserves to be placed in a monotypic genus as it has a very characteristic bill and a deeply forked tail, both characters unlike *Xema*, a related genus in which it was originally placed. The wing-pattern as well as the hood, the tail and the long wings show rather close relationship to the terns.

Oddly enough I have seen a moving picture of the white and speckled downy young running about on one of the islands but I have not examined a scientifically prepared specimen of the chick! Science has difficulty in keeping pace with modern invention.

XEMA

Xema sabini

Sabine's Gull

Plate XIV; Figures 379 to 384

Larus sabini SABINE, J., 1819, Trans. Linn. Soc. London, XII, part 2, p. 522, Pl. XXIX (near Melville Bay, Greenland).

Xema collaris LEACH, 1819, Ross's 'Voy. Baffin Bay,' 8 vo. Ed., II, p. 64.

Larus minutus BOLSMANN, 1852, Naumannia, II, part 3, p. 35.

DISTRIBUTION

Breeding range nearly circumpolar, covering the Arctic parts of North America and Asia, and including the west coast of Greenland, Southampton Island, Victoria Land, coasts of Mackenzie and Alaska south to Kuskokwim River, St. Lawrence Island, Anadyr Peninsula, Lena Delta, Taimyr Peninsula and Spitzbergen; winter range sub-arctic, in Europe chiefly the coasts of the North Sea and in North America chiefly the Pacific Coast where found casually and irregularly as far south as Peru; casual in the British Isles, France, Holland, Denmark, Germany and also in New York, Texas and the Bermuda Islands.

MEASUREMENTS

	MALES (15)	FEMALES (10)
Wing	256-284 (266.5)	245-267 (259.8)
Tail	113-126 (119.5)	108-131 (117.8)
Tarsus	31- 38 (33.7)	31- 35 (33.7)
Toe without claw	25- 28 (25.9)	25- 27 (26.0)
Culmen	22- 28 (25.5)	23- 28 (25.2)
Bill at base	6.5- 8 (7.5)	6.5- 8 (7.2)
Bill at angle	7- 8 (7.6)	6.5- 8 (7.3)

MOULTS AND PLUMAGES

Natal Down

REFERENCE SPECIMEN.—A. M. N. H., No. 119111; ♀; July 23, 1911; Victoria Land, Arctic Canada.

BACK, WINGS, AND FLANKS rich ochraceous buff, lined and spotted with deep clove-brown. HEAD: a similar buff scarcely spotted except on crown and occiput. UNDERPARTS white with ochraceous throat, sides and crissum, and unmarked except for obscure dusky spotting on crissum. BILL, in skin, flesh-brown base, dusky beyond angle. LEGS AND FEET, in skin, pale yellowish flesh.

Most like *ridibundus*, rather less spotted on head, the black duller.

Juvenal Plumage

Figures 379 to 381

REFERENCE SPECIMENS.—J. D., No. 8636; ♀; August 15, 1897; Point Barrow, Alaska. J. D., No. 52913; ♂; September 5, 1921; Godthaab, Greenland.

BACK AND MANTLE-AREA very dark neutral gray, soon fading to pale clove-brown, each feather with pale buff edgings next to a dusky bar, the edgings more prominent on scapulars; rump gray, tail-coverts white. HEAD AND NECK similar but edgings very faint, head browner, the forehead, lores, sides and postocular area white merging into the dark head, neck and auriculars; eye-crescent black, partial eye-ring white. UNDERPARTS white, some grayish or brownish clouding on sides of throat. WINGS: primaries black with one-half of inner webs white and apical spots increasing inward from the eighth or seventh and joined by white web at

about the fifth; the fourth or third to first white, alula and primary coverts black; secondaries white, the proximal quills gray at base on outer webs, tertials and lesser coverts browner and edged like the back, the lesser darkest on carpal area or "shoulders"; median coverts clear gray broadly white-edged, the proximal feathers darker; edge of wing and adjacent small coverts black, wing-lining white with dusky margins at edge of wing. The secondaries and their coverts form a broad white wing-band between the black flight-feathers and the gray coverts. TAIL white, the three middle pairs of rectrices with a terminal black band (20-25 mm.), and tipped with pale gray, the band diminished on the fourth and fifth pairs and reduced to a half-band on the inner webs of the distal pair. It accentuates the forking of the tail which is of a depth about equal to the width of the band. BILL (see Pl. XIV, fig. 5) "dull black, purplish flesh at extreme base" (A. Brooks, *in epistola*); in skin, flesh-brown at base, dusky tip. LEGS AND FEET (see Pl. XIV, fig. 5) "flesh-color, lavender-tinged" (A. B.); in skin, yellowish flesh. IRIS (see Pl. XIV, fig. 5) "umber-brown" (A. B.).

First Winter or Non-nuptial Plumage

REFERENCE SPECIMEN.—J. D., No. 53198; ♂; September 10, 1912; Monterey, California; moult just beginning.

Acquired by a partial postjuvenal moult in August and September.

Wings and tail of juvenal plumage retained. Head becomes largely white with dusky gray or plumbeous occiput and auriculars in a half-cap and a gray mantle is acquired; gray on sides of breast. Bill and other soft parts like the juvenal.

First Nuptial Plumage

Not seen.

Acquired by a partial prenuptial moult not including wings or tail, in the spring.

Doubtless much like the first winter except that a grayish plumbeous hood is acquired, which is very likely imperfect.

Second Winter or Non-nuptial Plumage (Adult)

Figures 382 to 384

REFERENCE SPECIMENS.—J. D., No. 53199; ♂; October 10, 1912; Monterey Bay, California. J. D., No. 8331; ♂; August 3, 1897; Wainwright Inlet, Alaska.

Acquired by a complete postnuptial moult in August and September.

Much like the first winter, the primaries, however, all with white apical spots and the tail white.

MANTLE neutral gray. HEAD AND NECK white, occiput and an adjacent half-collar, auriculars, and eye-crescent black. UNDERPARTS white, sides of breast faintly gray. WINGS: little different from the juvenal, the fifth primary with more white and all primaries with apical spots. TAIL white. BILL, in skin, basal two-thirds abruptly black, terminal third pale yellow. LEGS AND FEET, in skin, dusky flesh-brown, blacker in older skins. IRIS brown (*ex label*).

Second Nuptial Plumage (Adult)

Figures 382 to 384

REFERENCE SPECIMENS.—J. D., No. 16047; ♂; May 25, 1904; Pacific Grove, California. J. D., No. 8331; ♂; August 3, 1897; Wainright Inlet, Alaska; post-nuptial moult just beginning, the forehead white and the occiput gray with new feathers, the old black ones of the collar still remaining.

Acquired by a partial prenuptial moult not including wings or tail, in April and May. Like the second winter but a plumbeous or dark neutral gray hood replaces the white head, and there is a complete narrow black collar where the hood joins the white neck; no eye-ring.

BILL "black, basally apricot-yellow distal third, brownish clove at tip of maxilla; gape grenadine to salmon-orange" (Bishop). LEGS AND FEET "black mottled with light gull-gray" (B.). IRIS "chestnut-brown" (B.); eyelids and inside of mouth vermilion. (Witherby).

SUMMARY

Xema sabini, a species of the far North, is possessed of characters that merit placing it in the monotypic genus *Xema*. It is the only gull besides *Creagrus furcatus* that has a decidedly forked tail and Leach, in characterizing the genus in 1919, truly said: "This genus approaches to the GULL in the form of its beak and to the TERN, in having a furcate tail, as well as in the general form and proportions of its legs;" He might have noted also the tern-like pattern of the wings which is found in all plumages of this species. It seems to me this character, taken with the others, points to a rather close relationship to the Sternidæ, closer certainly than that of any of the other gulls excepting perhaps *Creagrus furcatus*.

Witherby makes the statement that he thinks there is a complete prenuptial moult. I can find no evidence of this.

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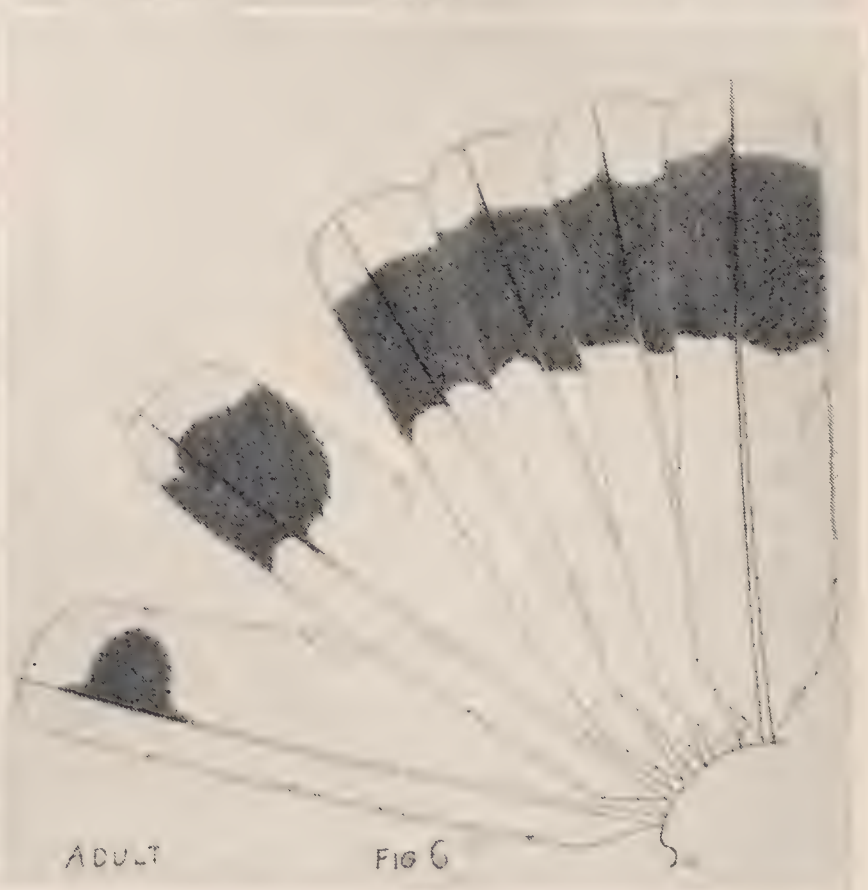
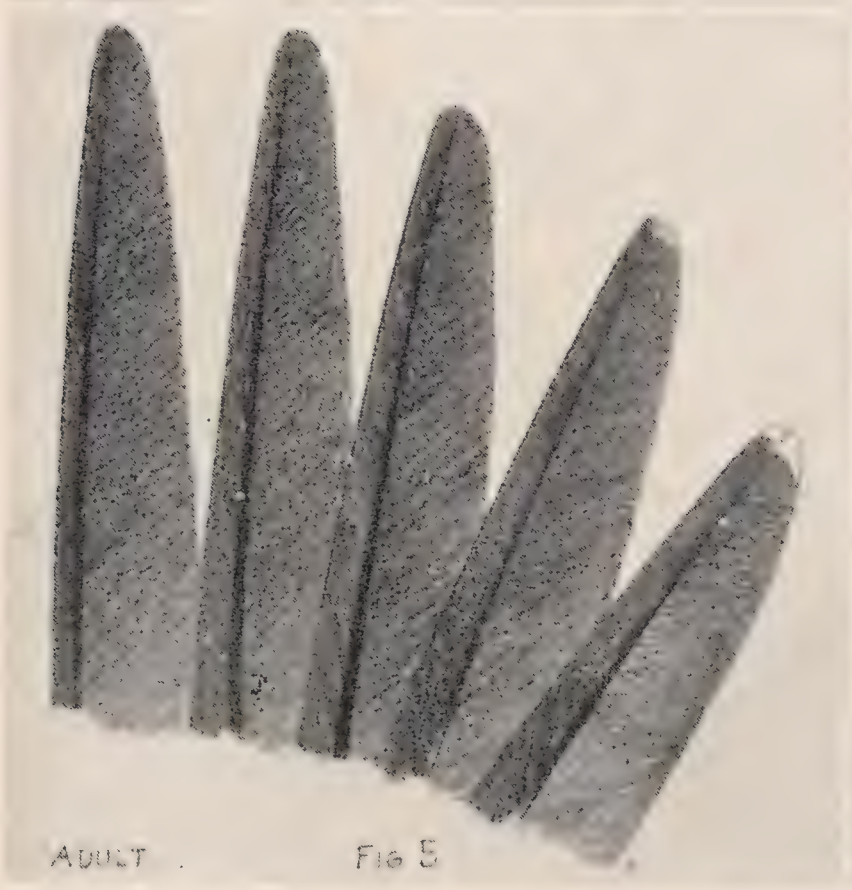
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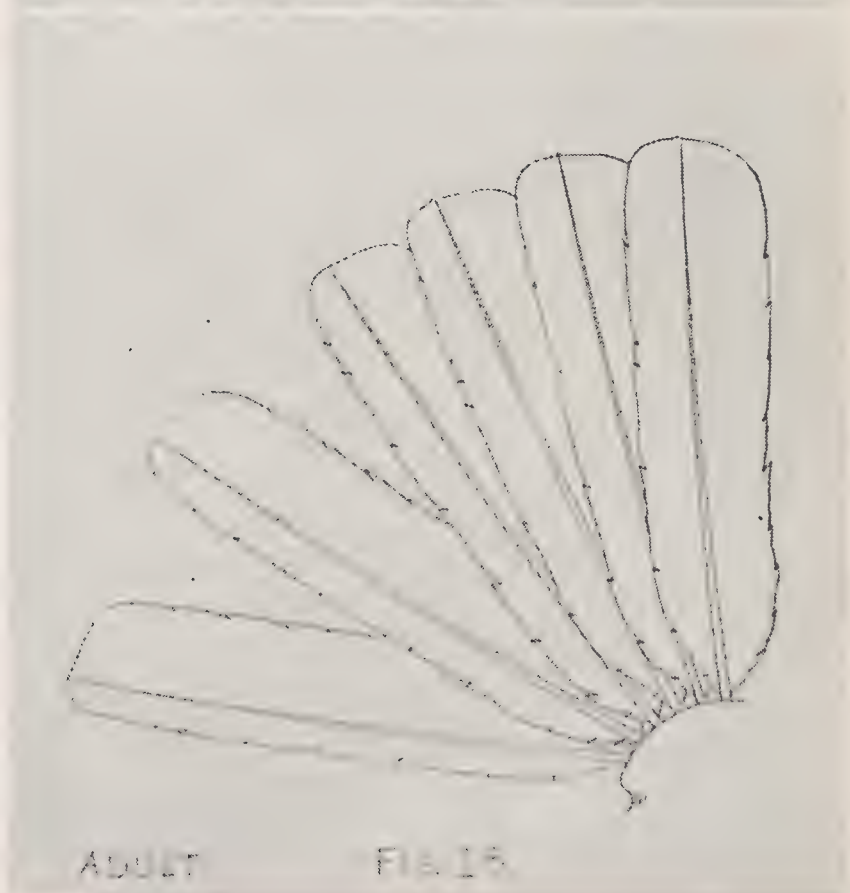
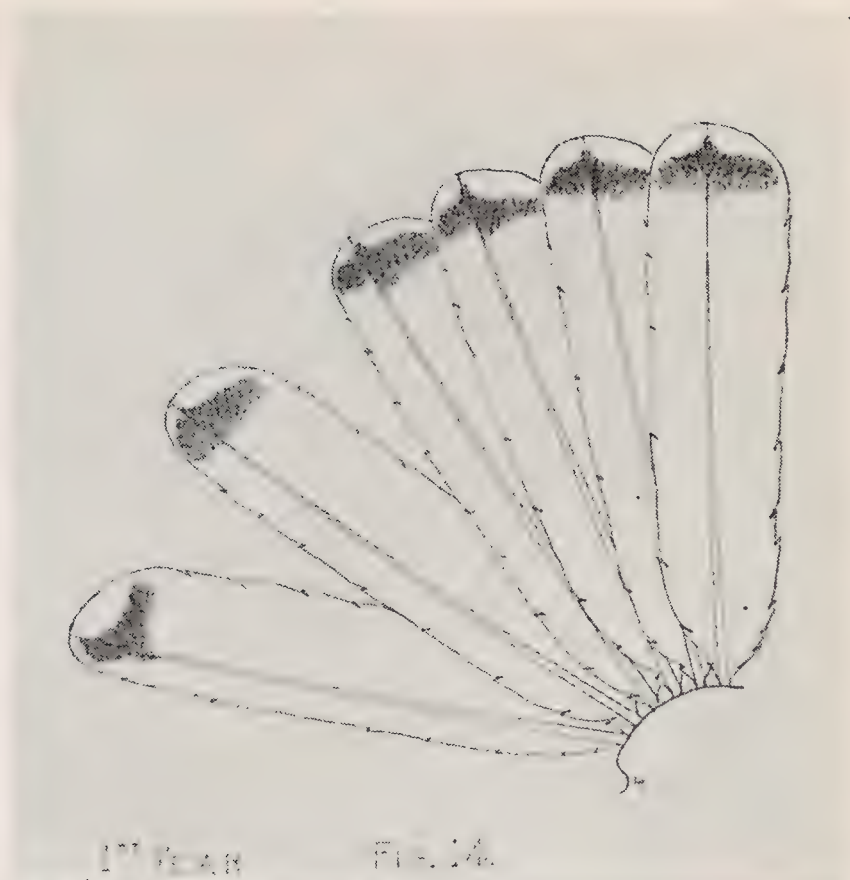
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cuts.



Gabianus pacificus





Pagophila alba



1st YEAR

FIG. 19



1st YEAR

FIG. 20



2nd YEAR

FIG. 21



2nd+3rd YEAR

FIG. 22



ADULT

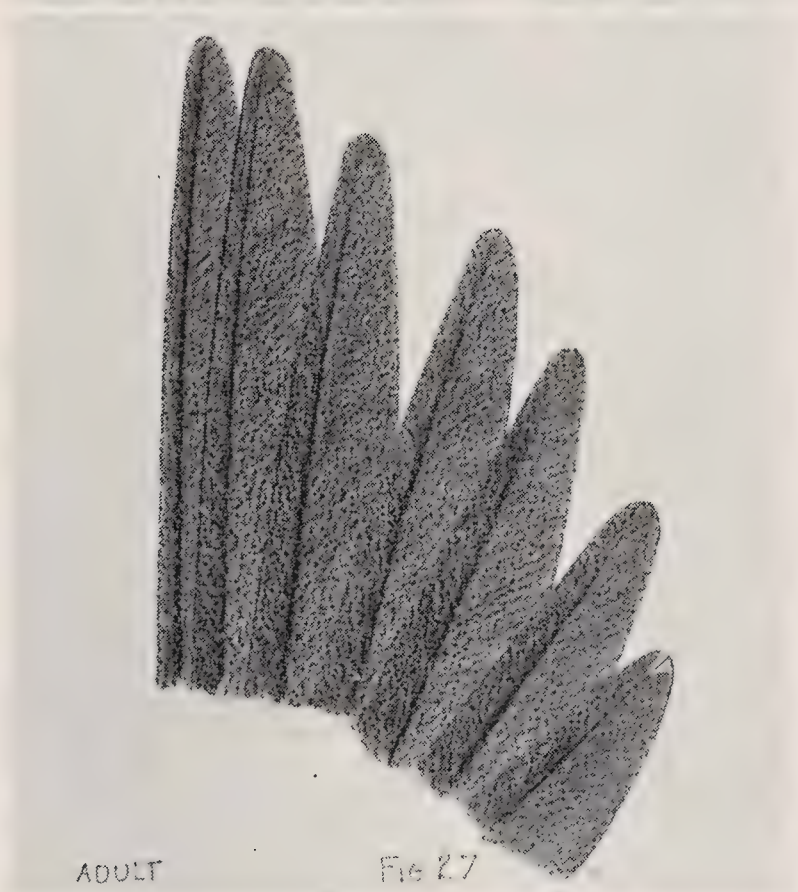
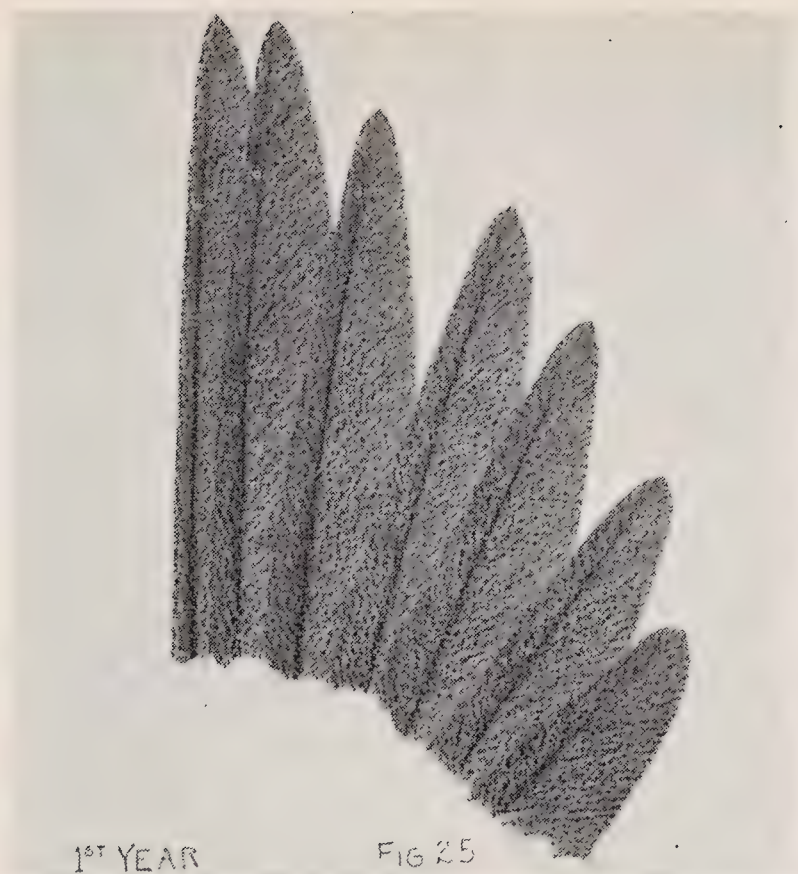
FIG. 23



ADULT

FIG. 24

Larus fuliginosus



Larus modestus



Larus heermanni



1ST YEAR

FIG. 37



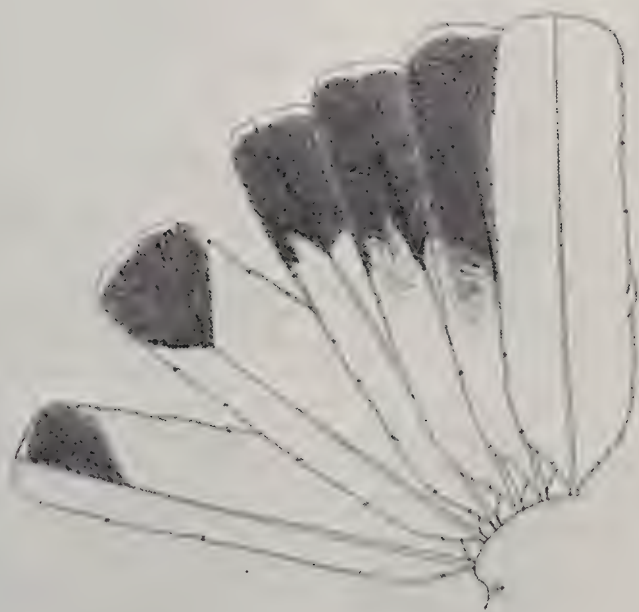
1ST YEAR

FIG. 38



1ST+2ND YEAR

FIG. 39



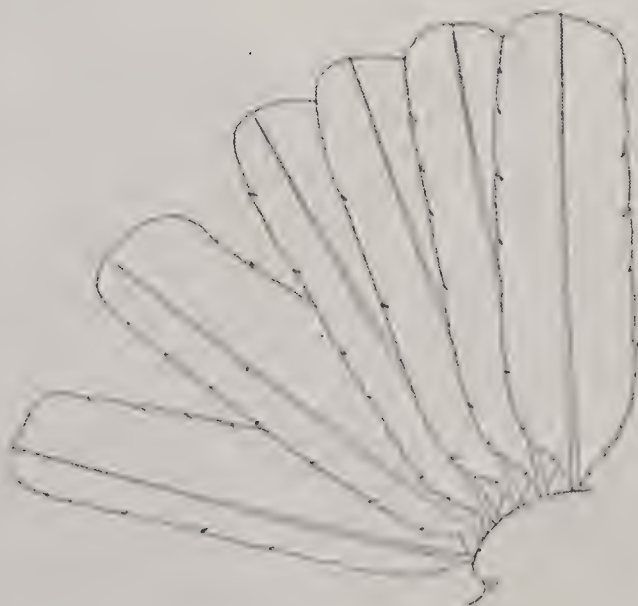
2ND YEAR

FIG. 40



ADULT

FIG. 41



ADULT

FIG. 42

Larus leucophthalmus



Larus hemprichi



1ST YEAR

FIG. 49



1ST YEAR

FIG. 50



2^D YEAR

FIG. 51



2^D YEAR

FIG. 52



ADULT

FIG. 53



ADULT

FIG. 54

Larus belcheri



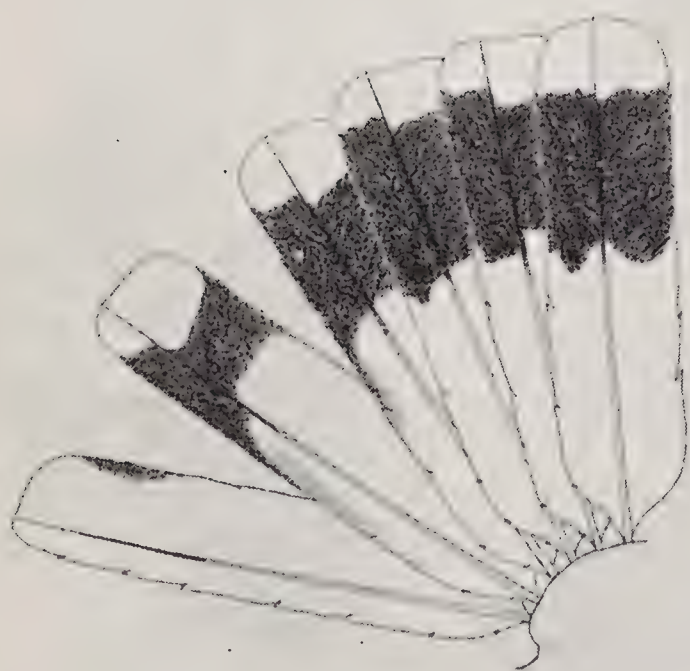
1ST YEAR

FIG. 55



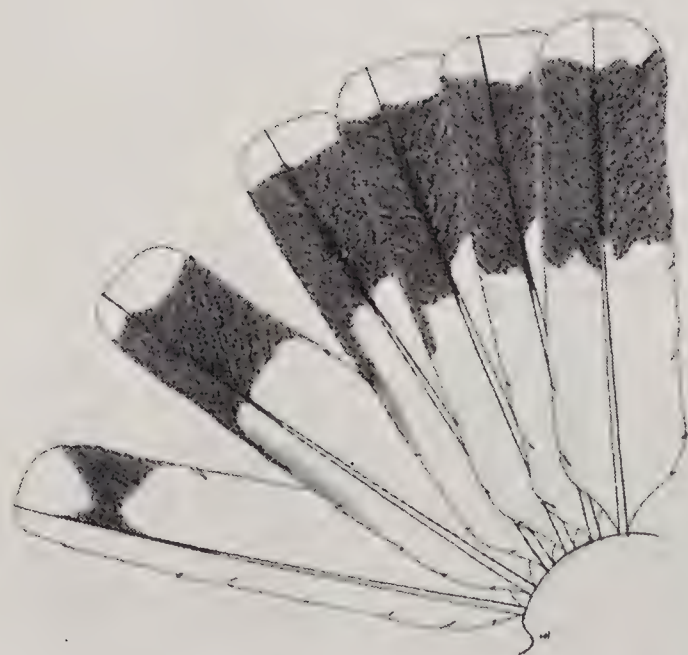
1ST YEAR

FIG. 56



ADULT

FIG. 57



2ND YEAR

FIG. 58



ADULT

FIG. 59



ADULT

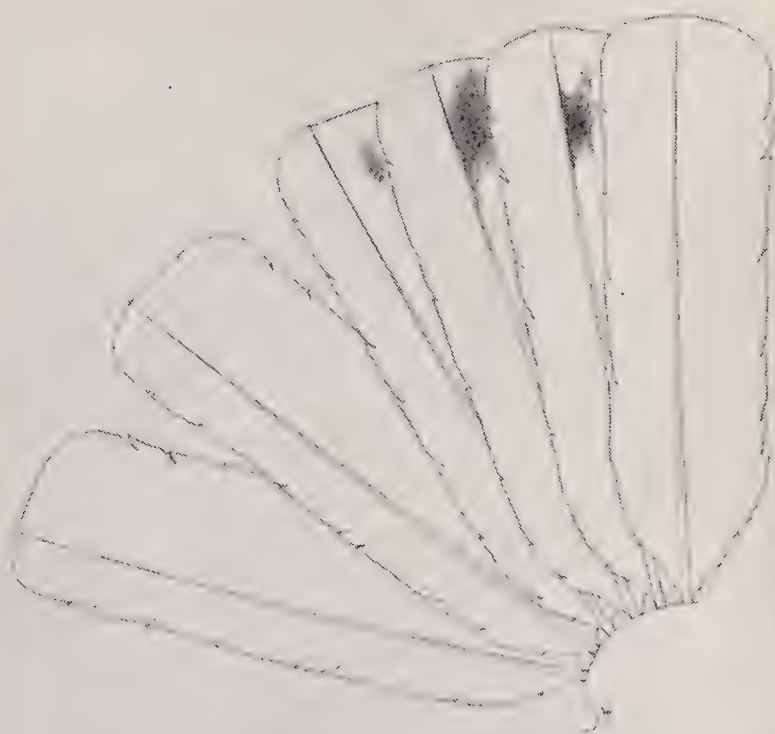
FIG. 60

Larus crassirostris



3rd YEAR

FIG. 61



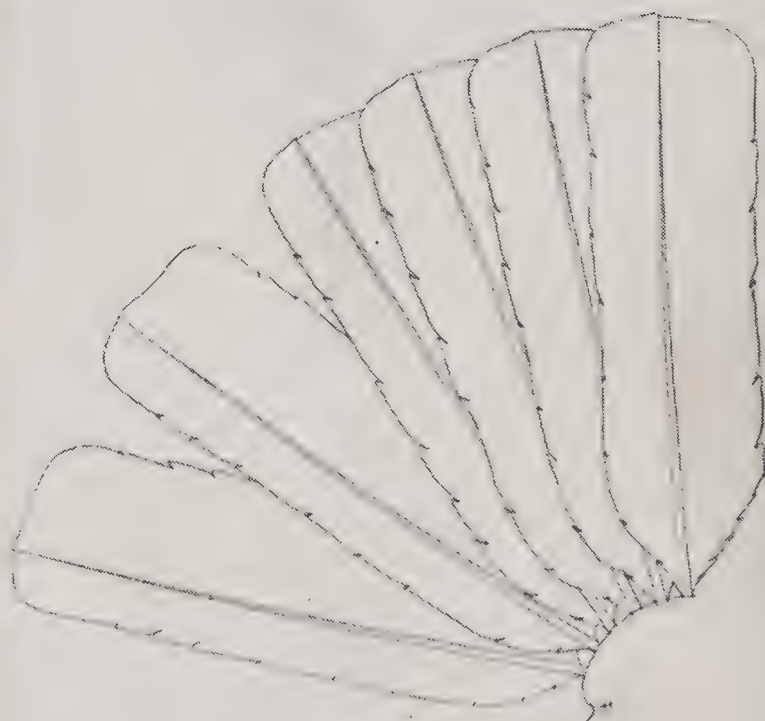
3rd YEAR

FIG. 62



ADULT

FIG. 63



ADULT

FIG. 64



ADULT

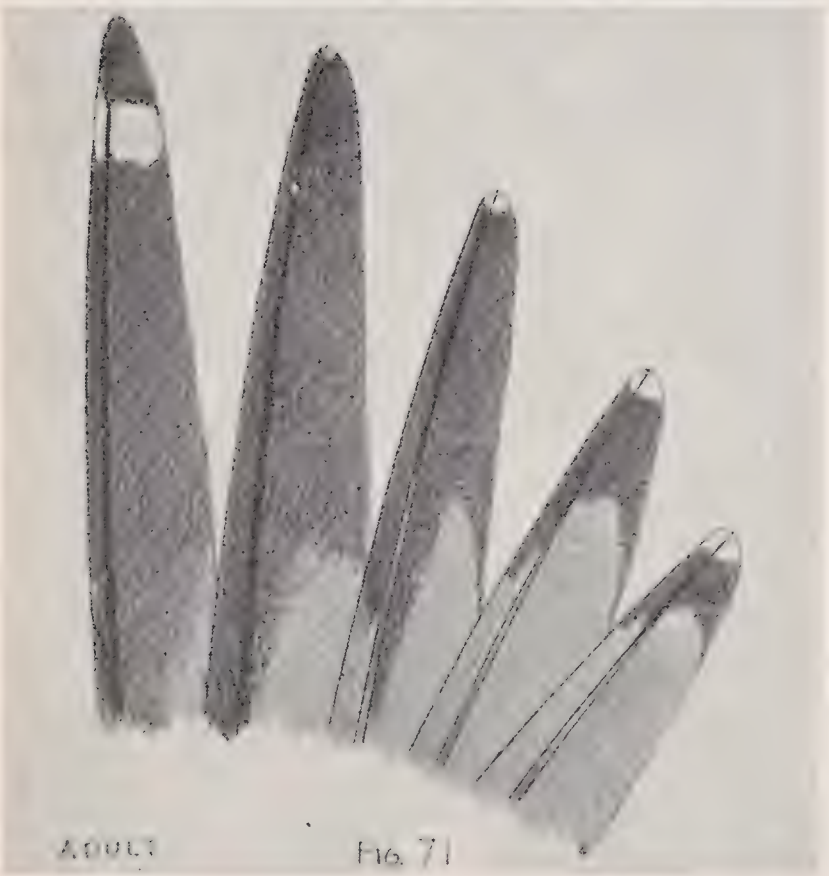
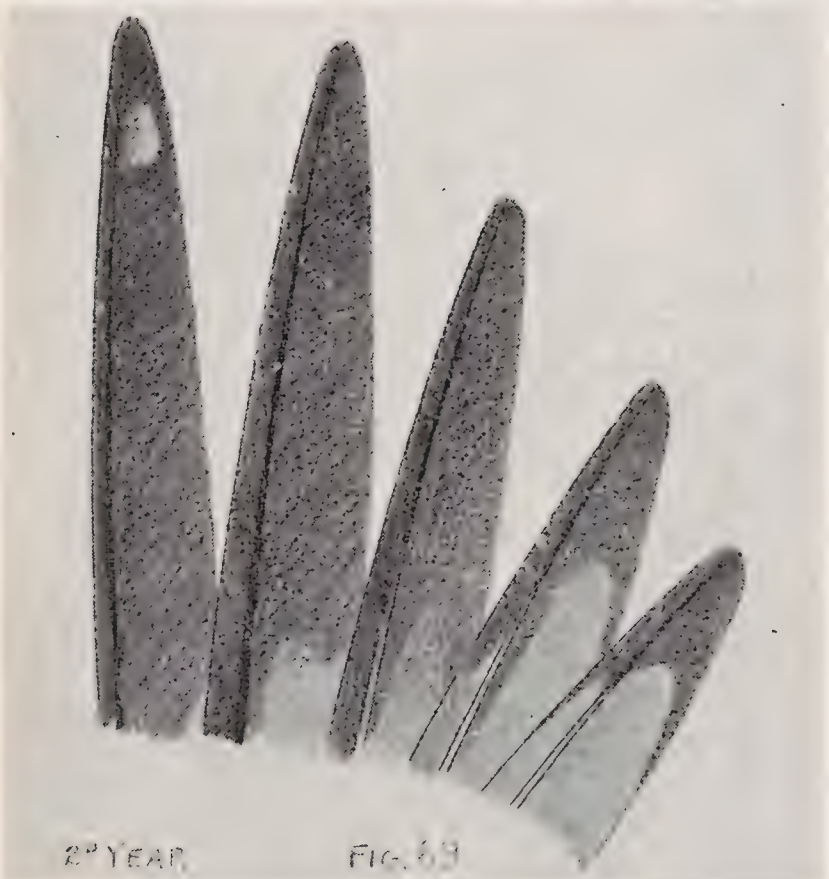
FIG. 65



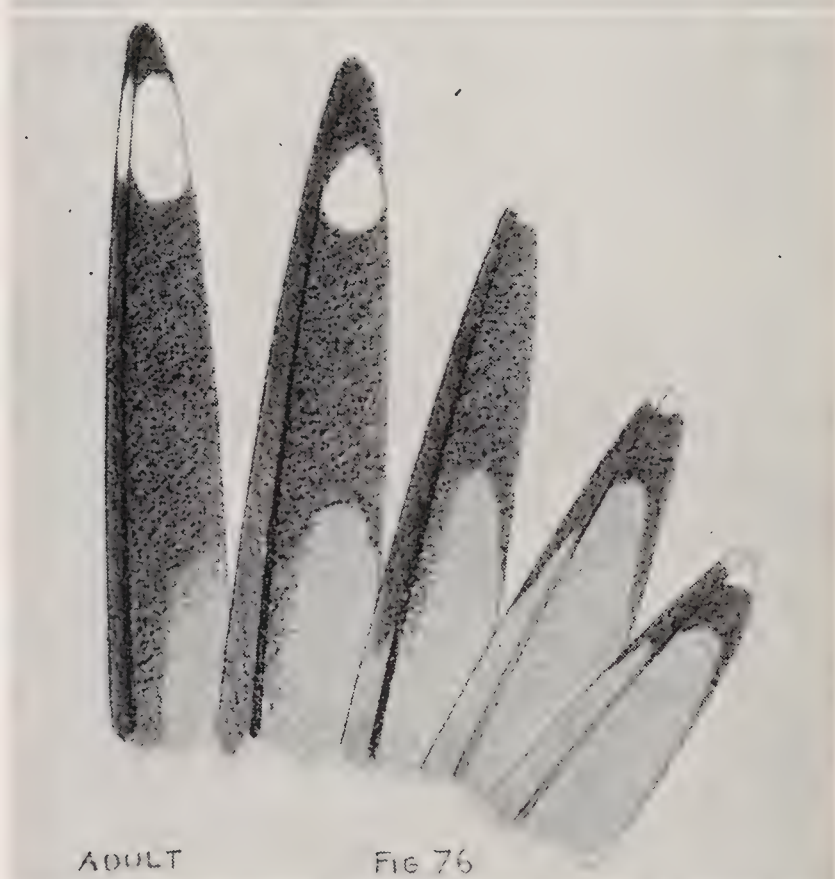
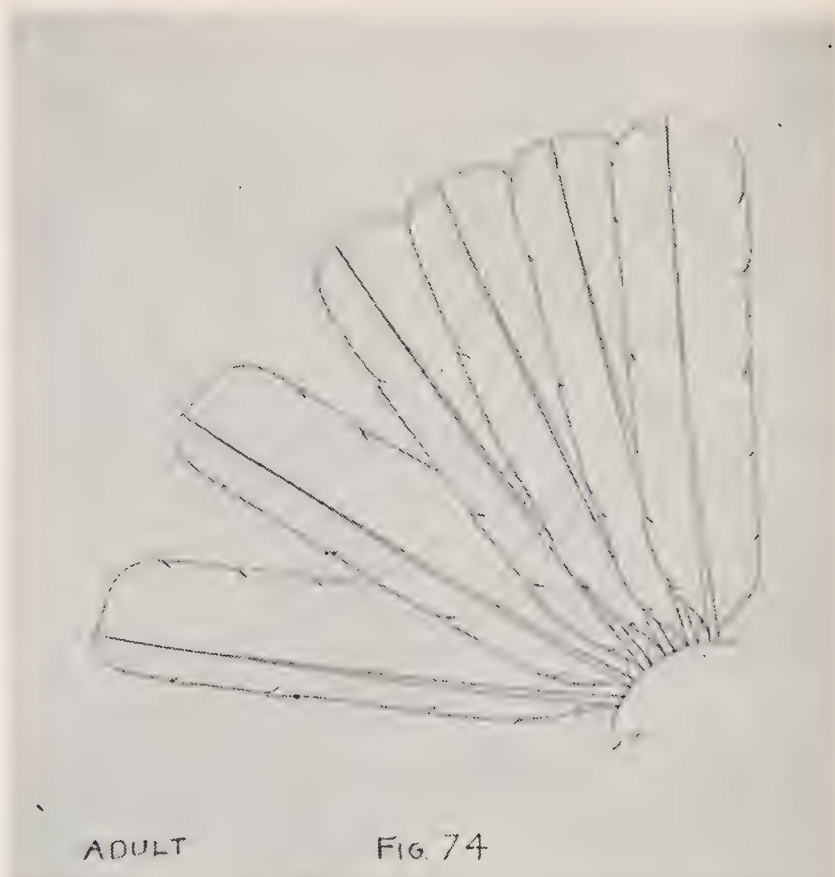
ADULT

FIG. 66

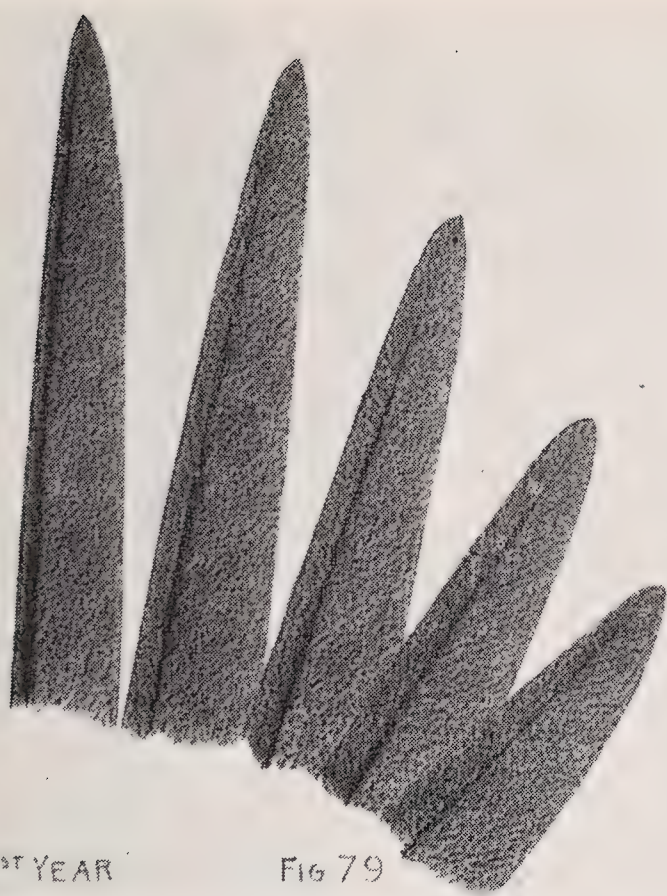
Larus audouini



Larus delawarensis

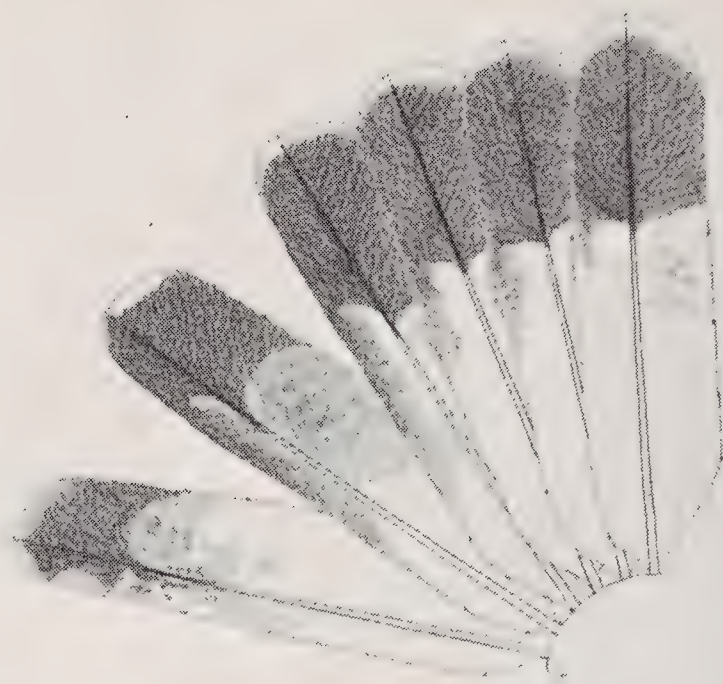


Larus delawarensis .



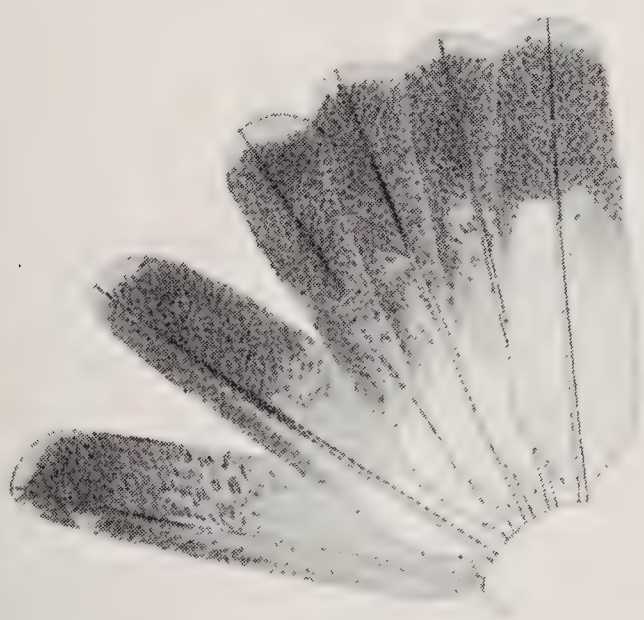
1ST YEAR

FIG 79



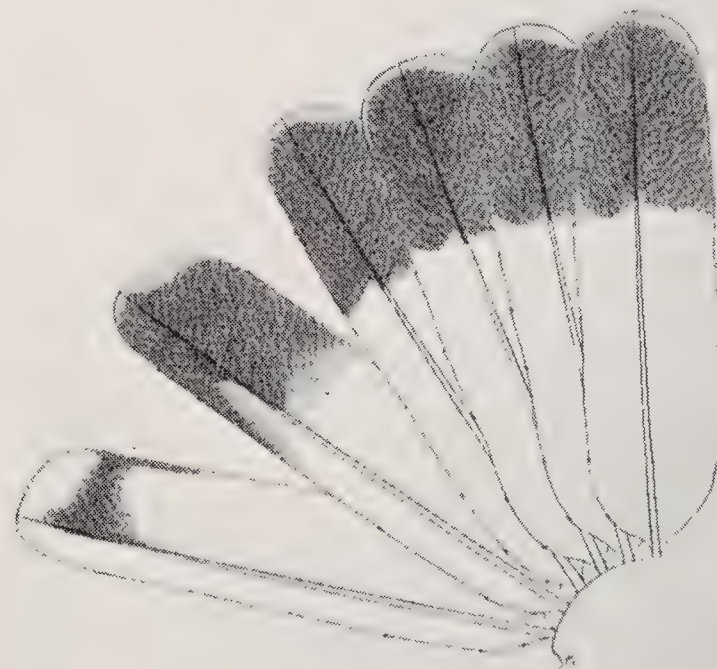
1ST YEAR

FIG. 80



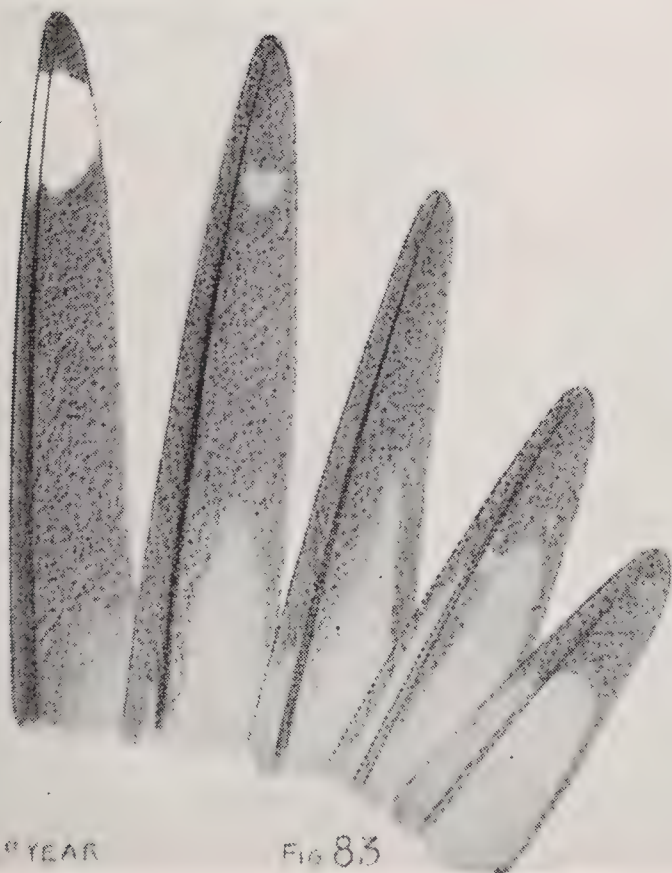
1ST YEAR

FIG. 81



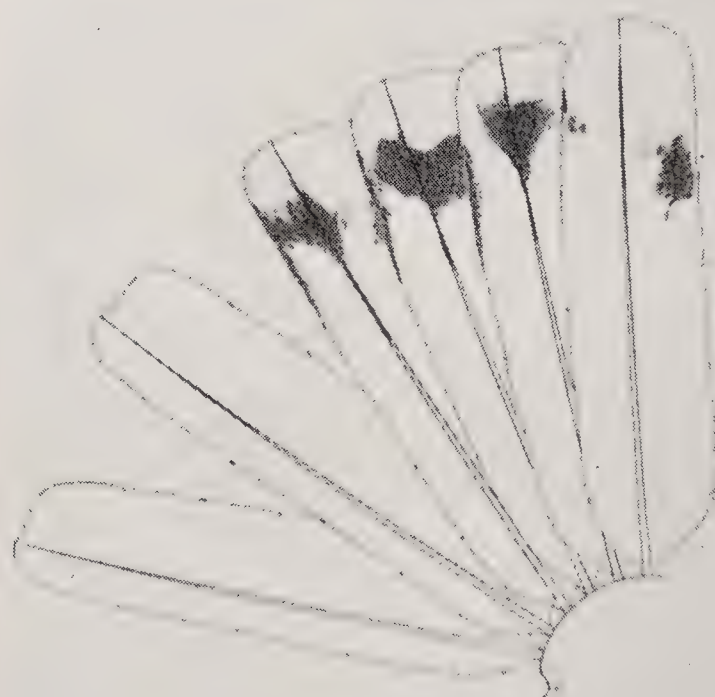
1ST YEAR

FIG. 82



2ND YEAR

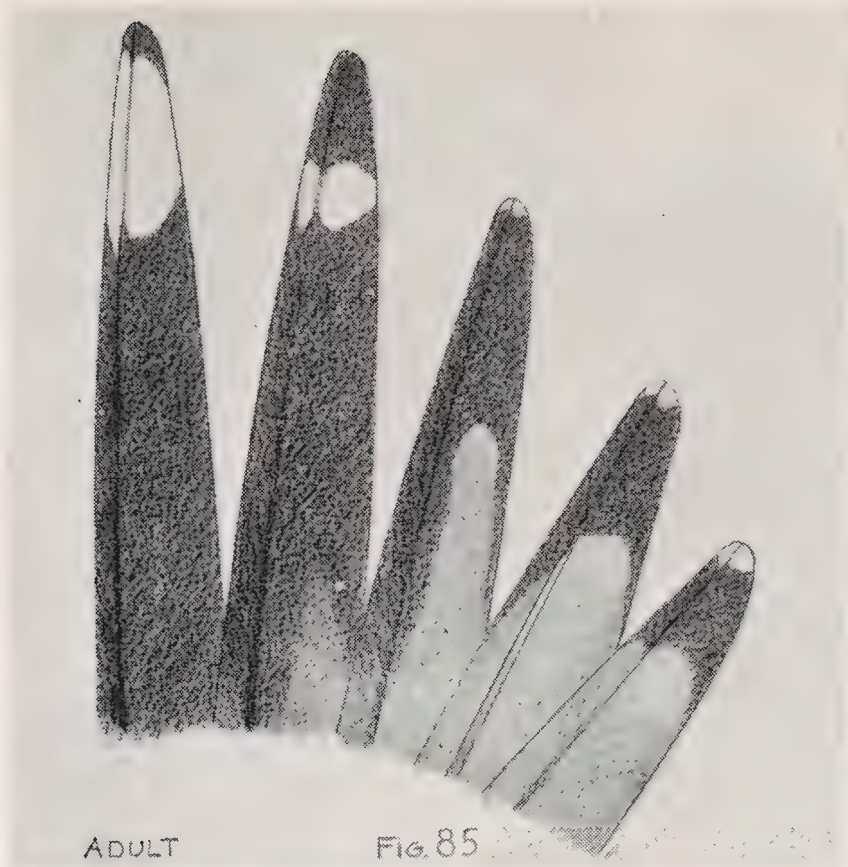
FIG 83



2ND YEAR

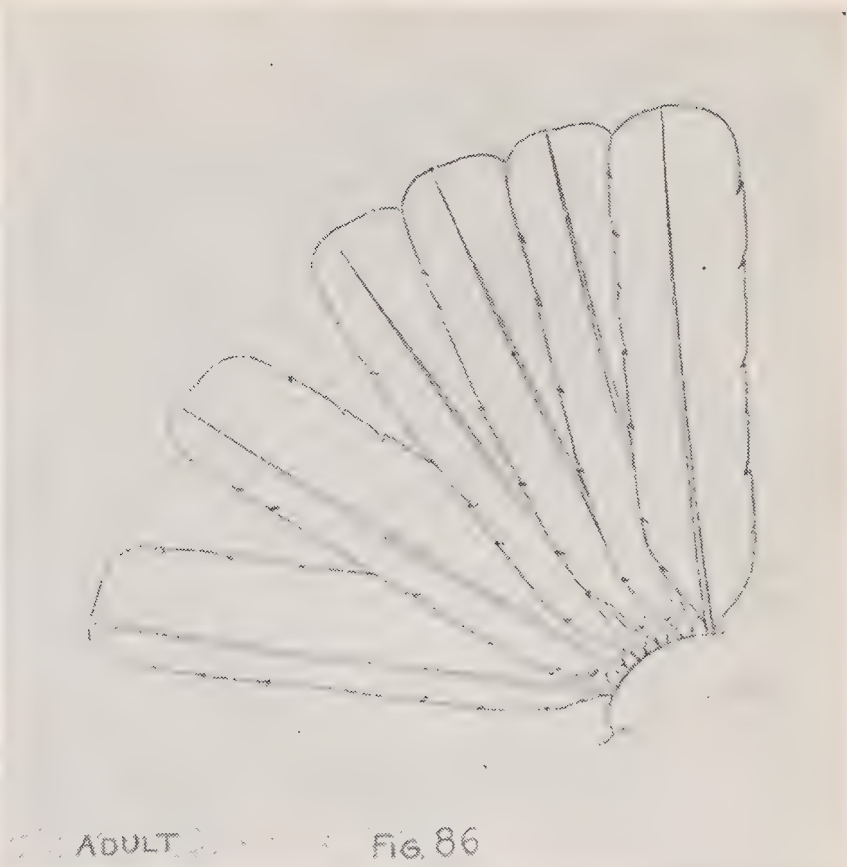
FIG 84

Larus canus canus



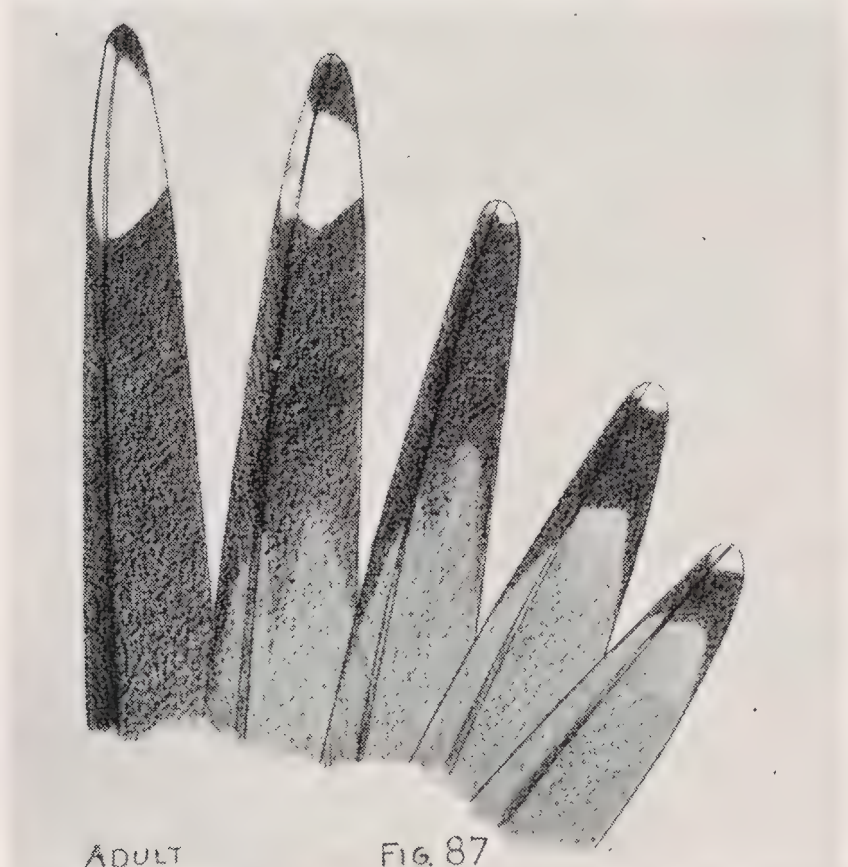
ADULT

FIG. 85



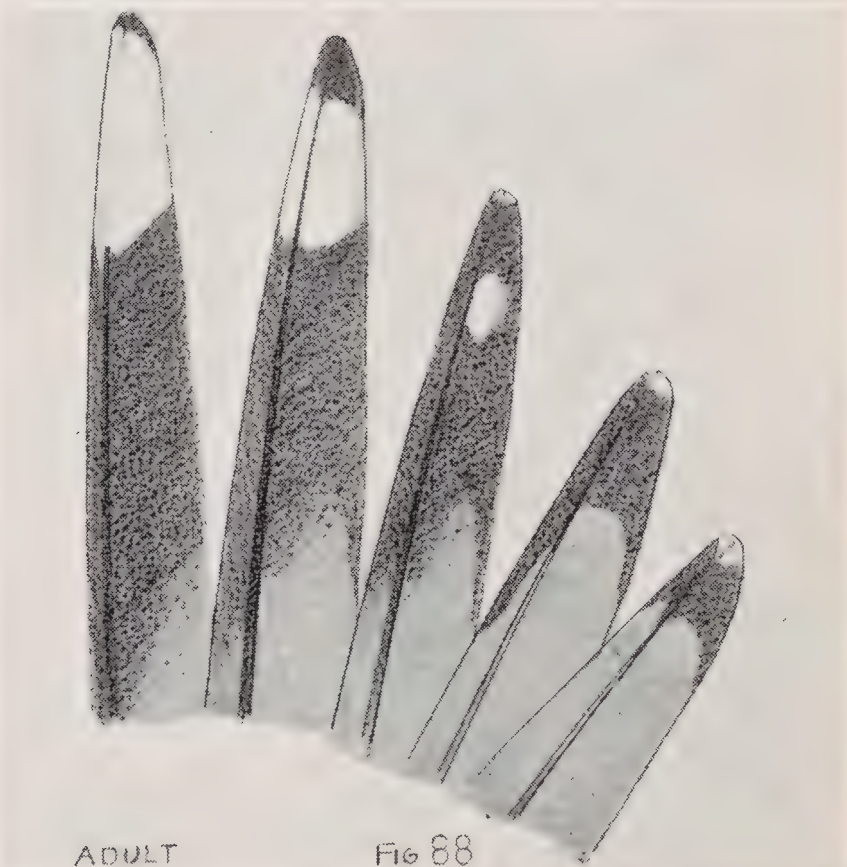
ADULT

FIG. 86



ADULT

FIG. 87



ADULT

FIG. 88



ADULT

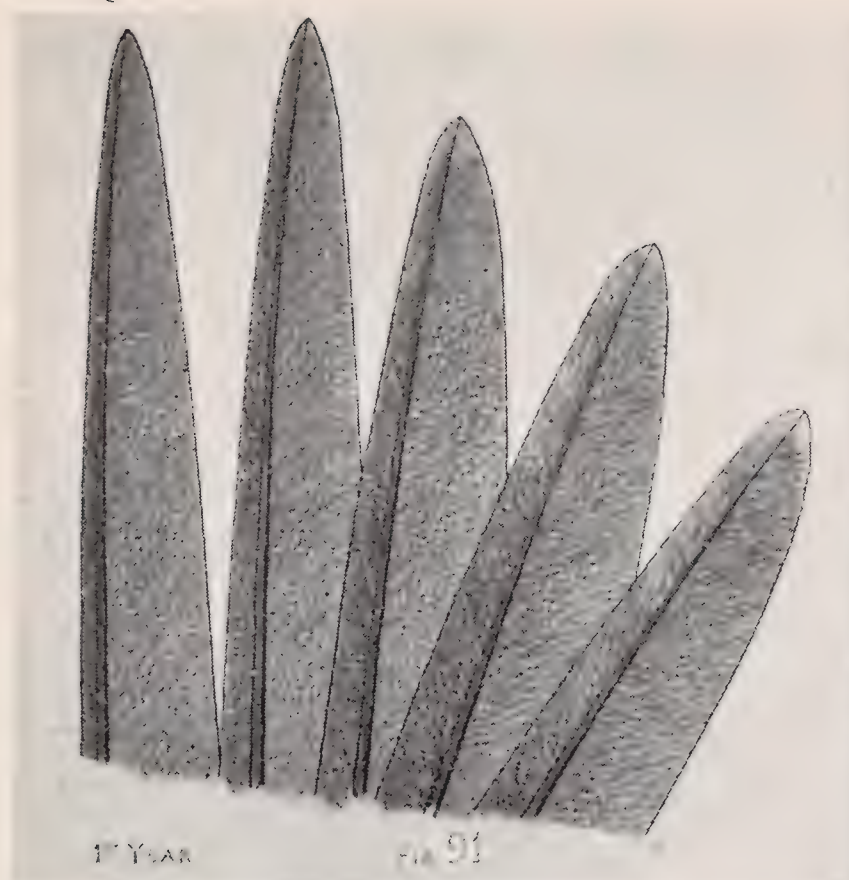
FIG. 89



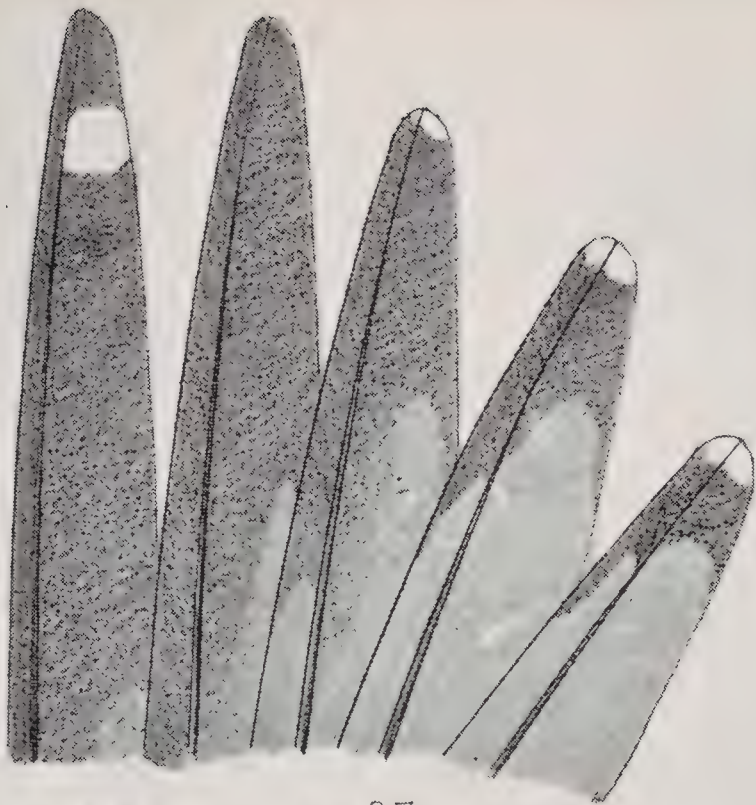
ADULT

FIG. 90

Larus canus canus

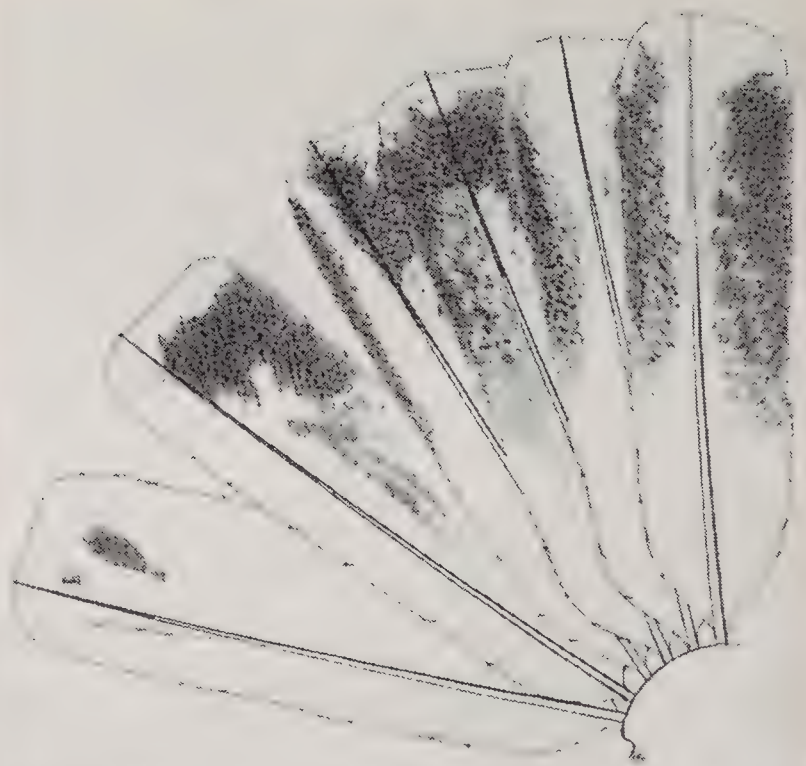


Larus argentatus argentatus (Fig. 94).
Larus argentatus smithsonianus (Figs. 91 to 93, 95, 96)



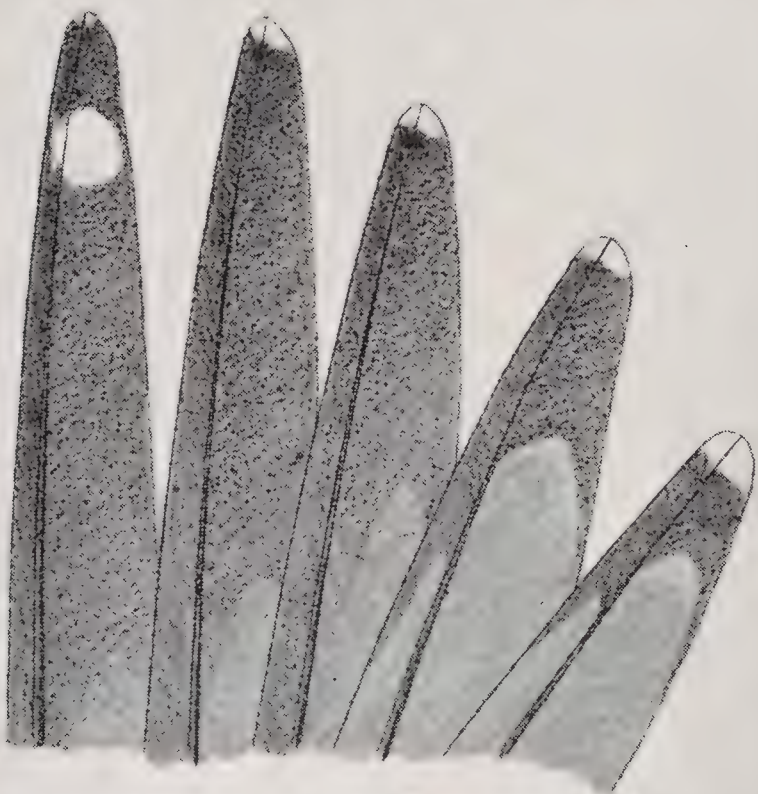
3^D YEAR

FIG. 97



3^D YEAR

FIG. 98



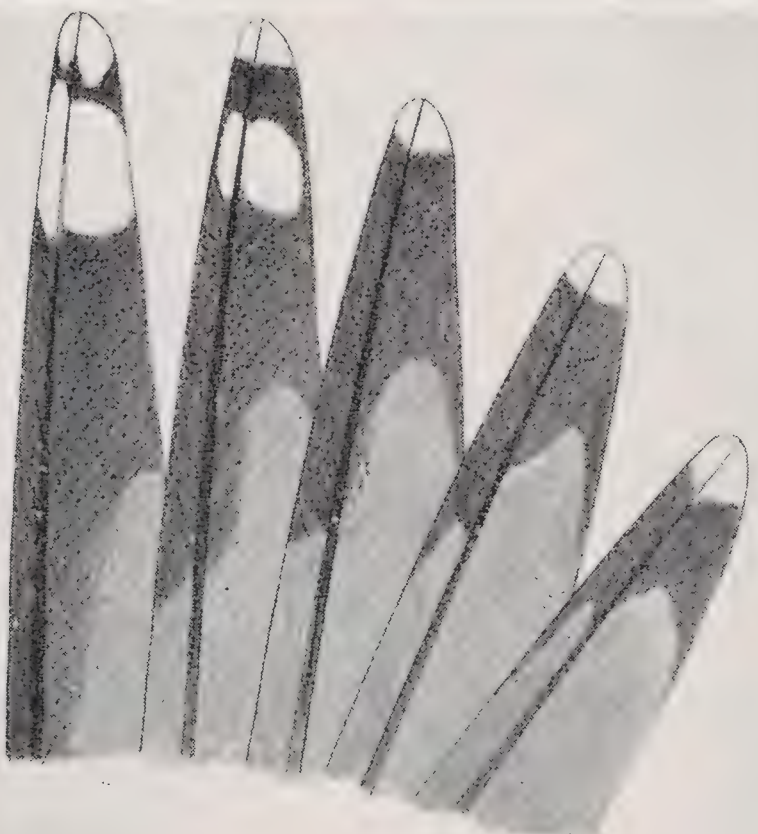
3^D YEAR

FIG. 99



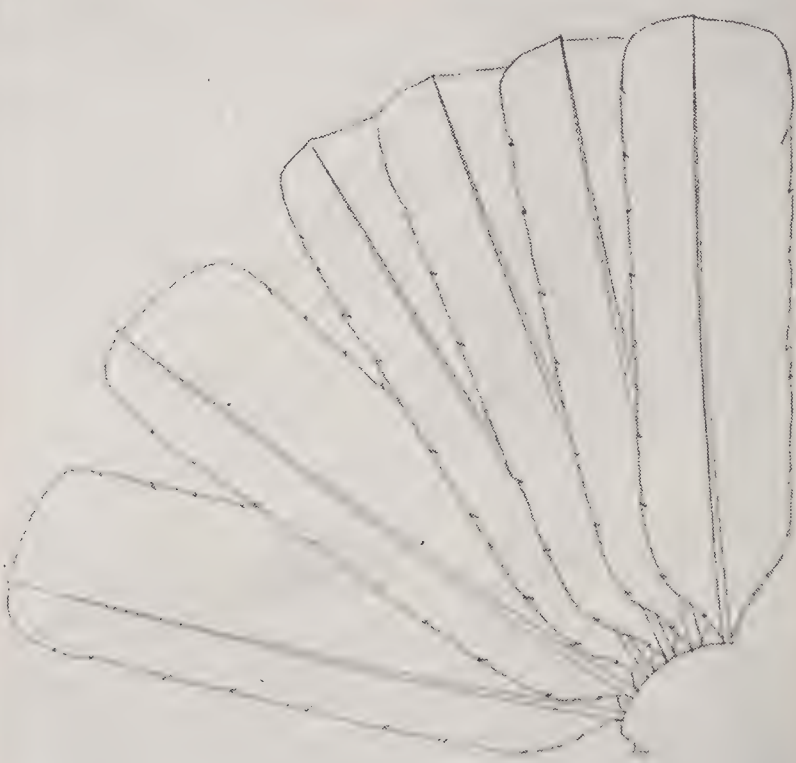
3^D YEAR

FIG. 100



ADULT

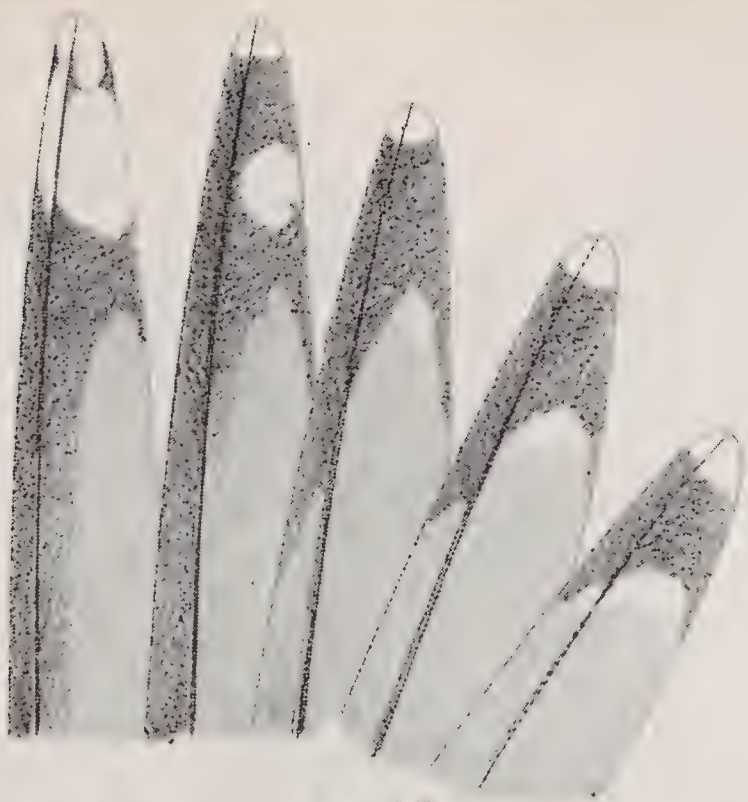
FIG. 101



ADULT

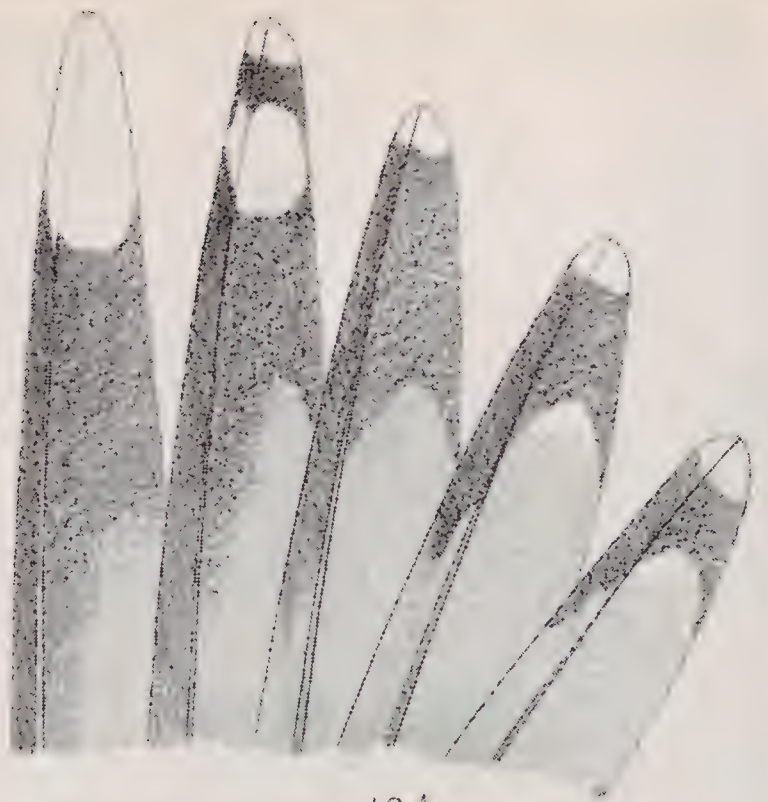
FIG. 102

Larus argentatus smithsonianus



ADULT

FIG. 103



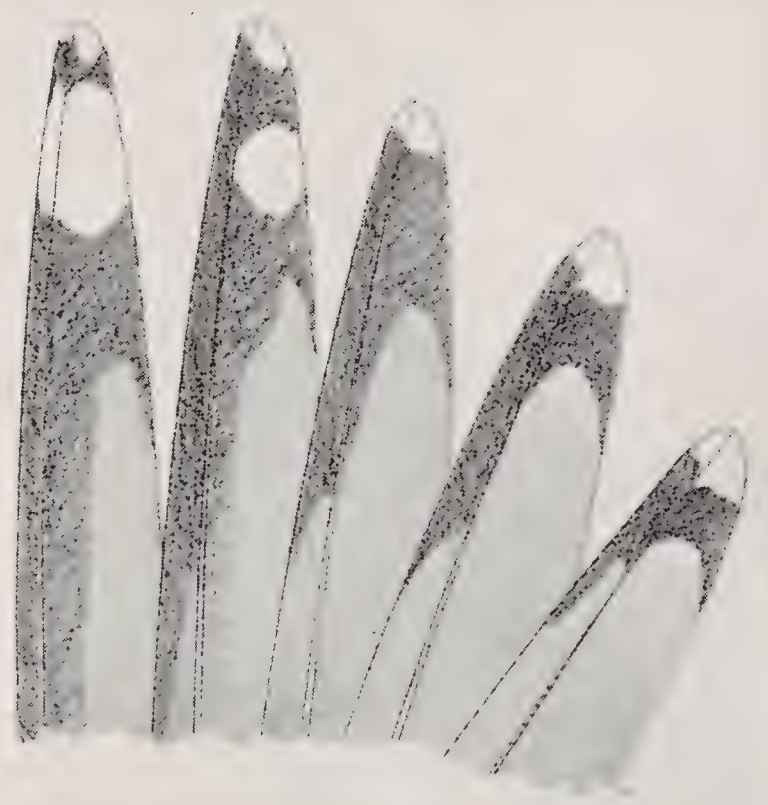
ADULT

FIG. 104



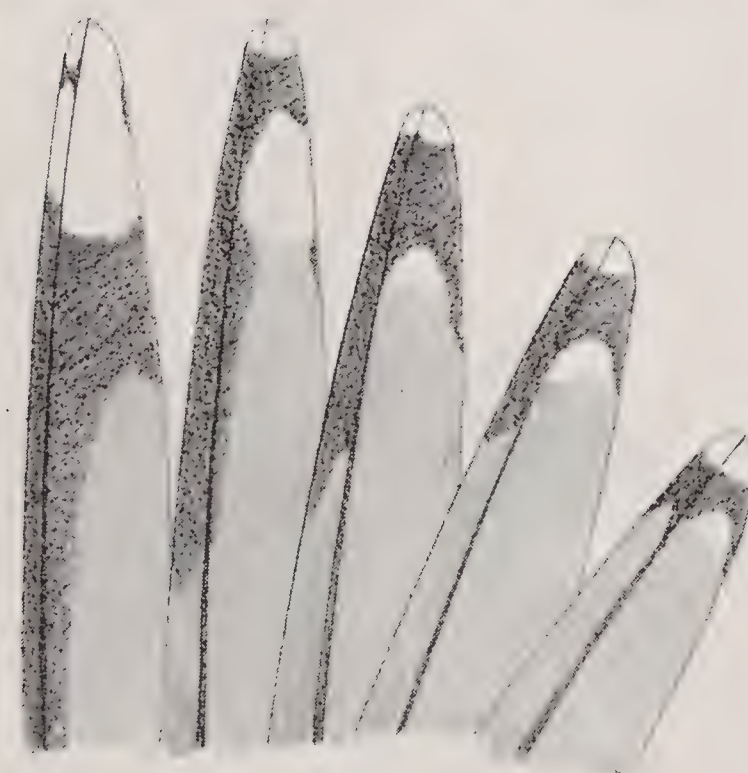
ADULT

FIG. 105



ADULT

FIG. 106



ADULT

FIG. 107



ADULT

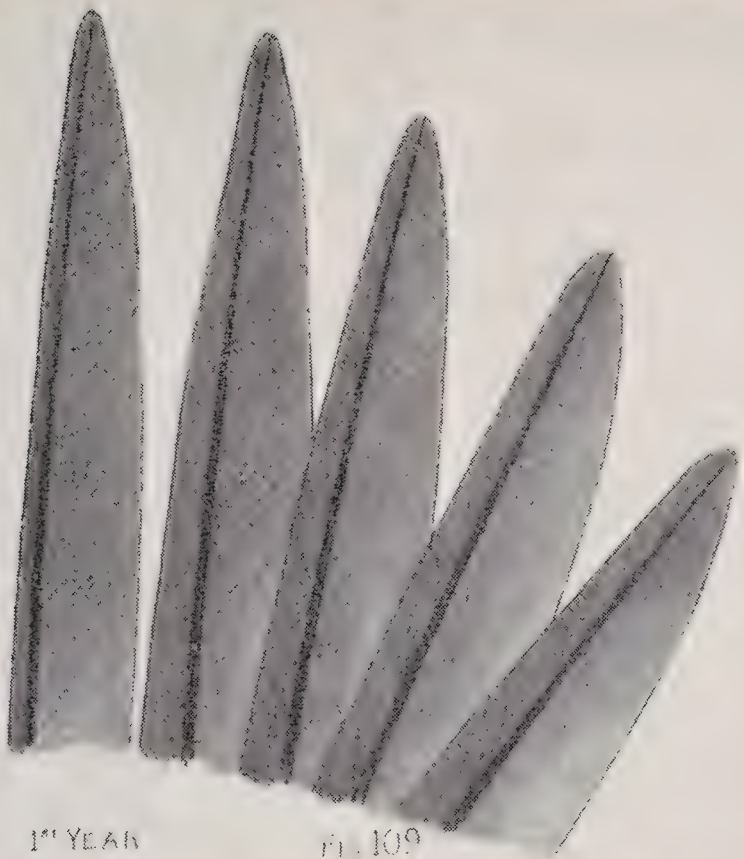
FIG. 108

Larus argentatus smithsonianus (Fig. 103)

Larus argentatus argentatus (Fig. 104)

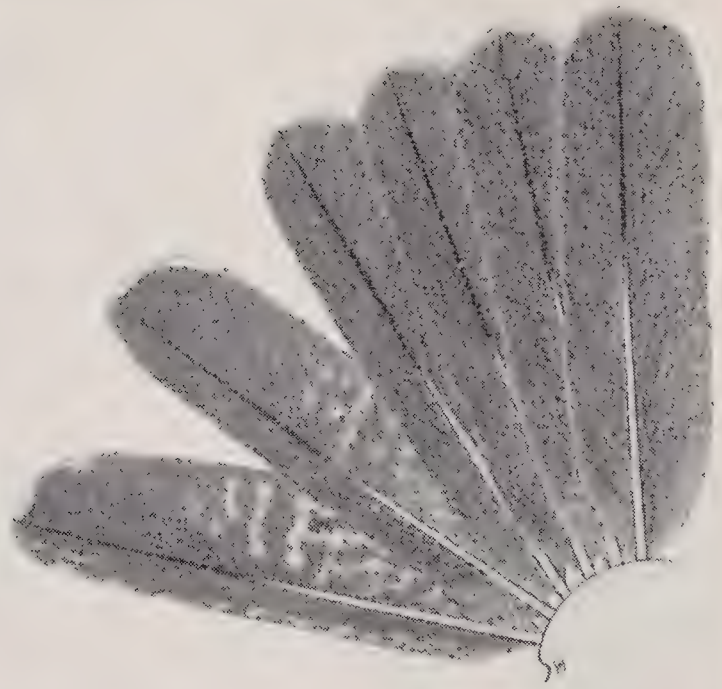
Larus argentatus vegæ (Figs. 105, 106)

Larus argentatus thayeri (Figs. 107, 108)



1st YEAR

FIG. 109



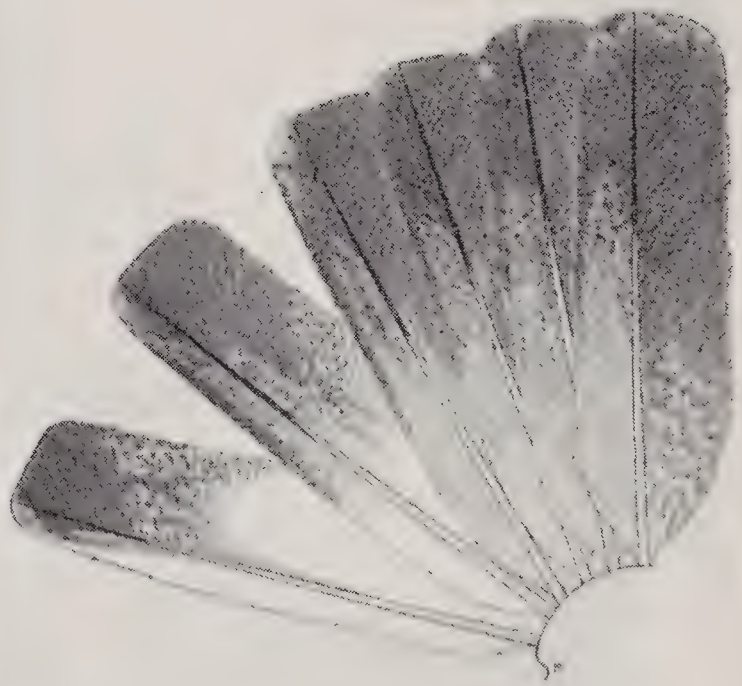
1st YEAR

FIG. 110



2nd YEAR

FIG. 111



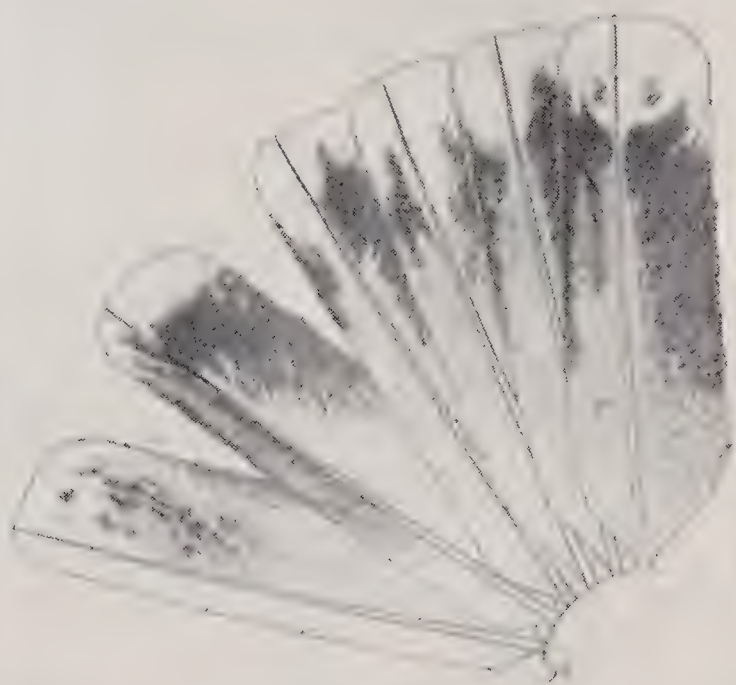
2nd YEAR

FIG. 112



3rd YEAR

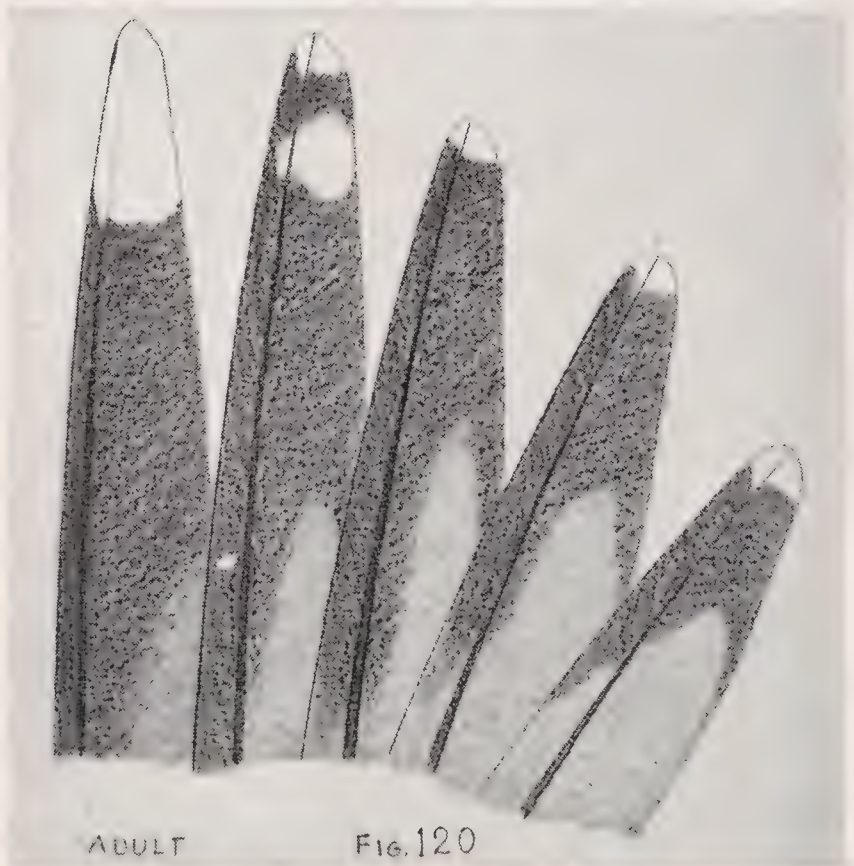
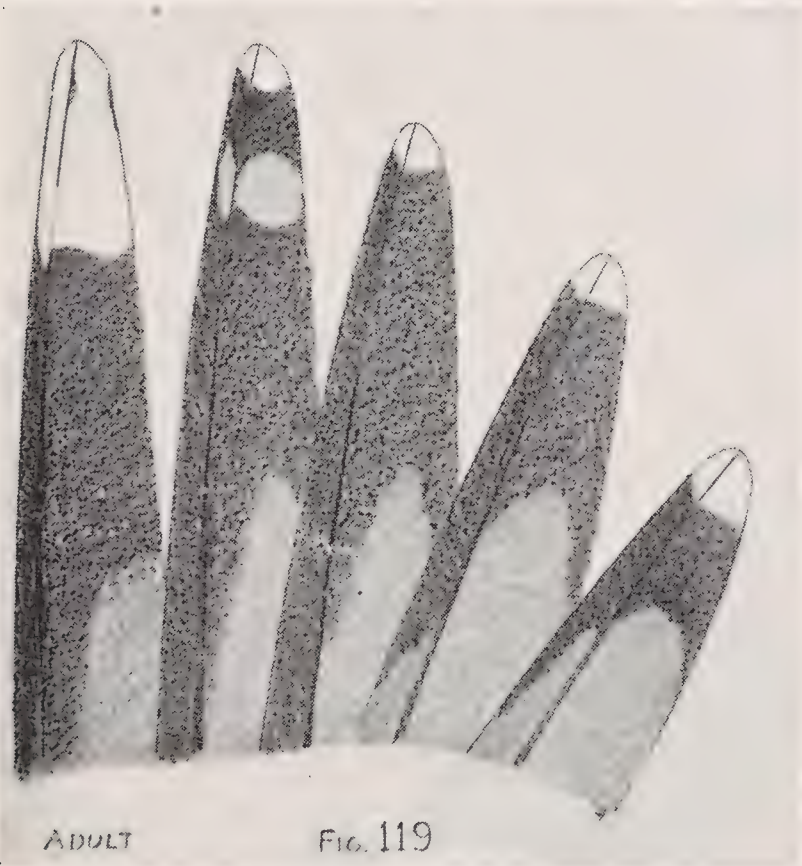
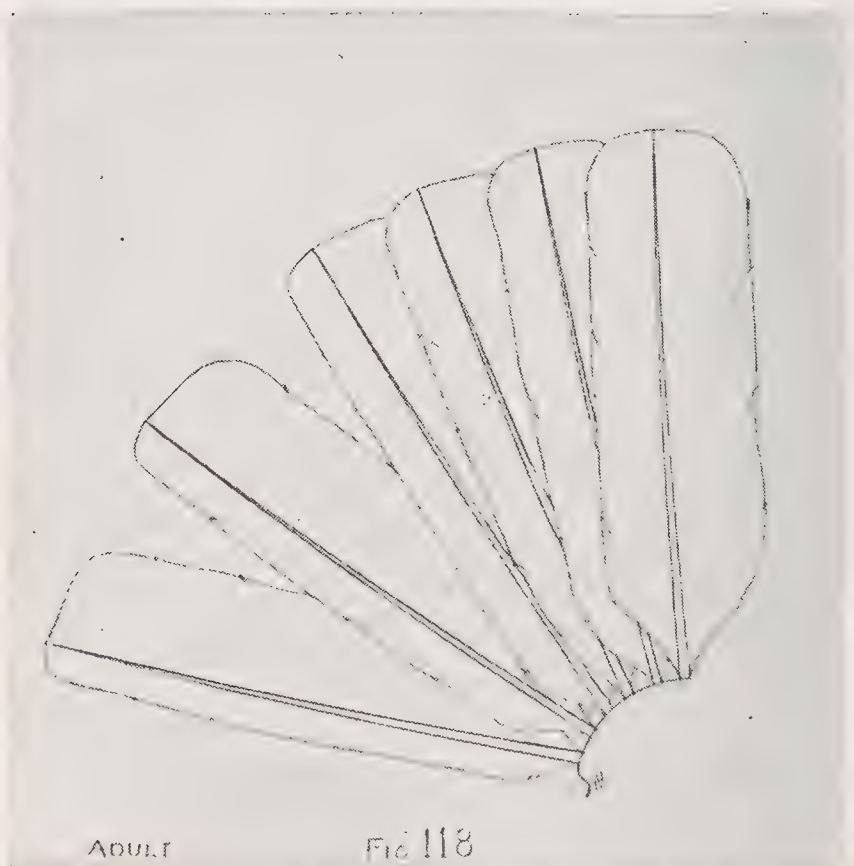
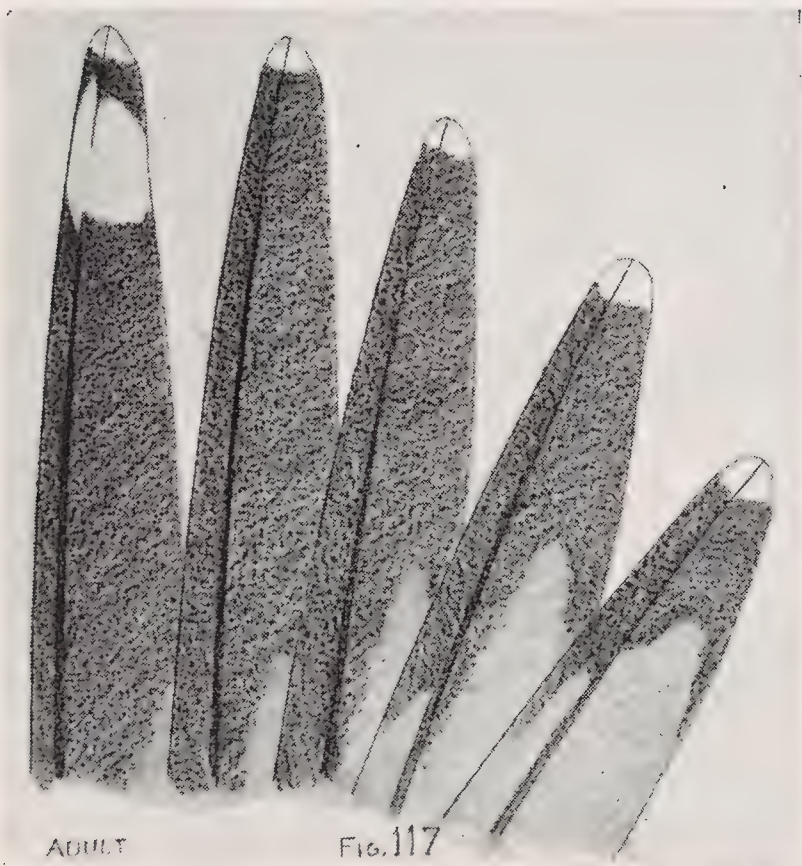
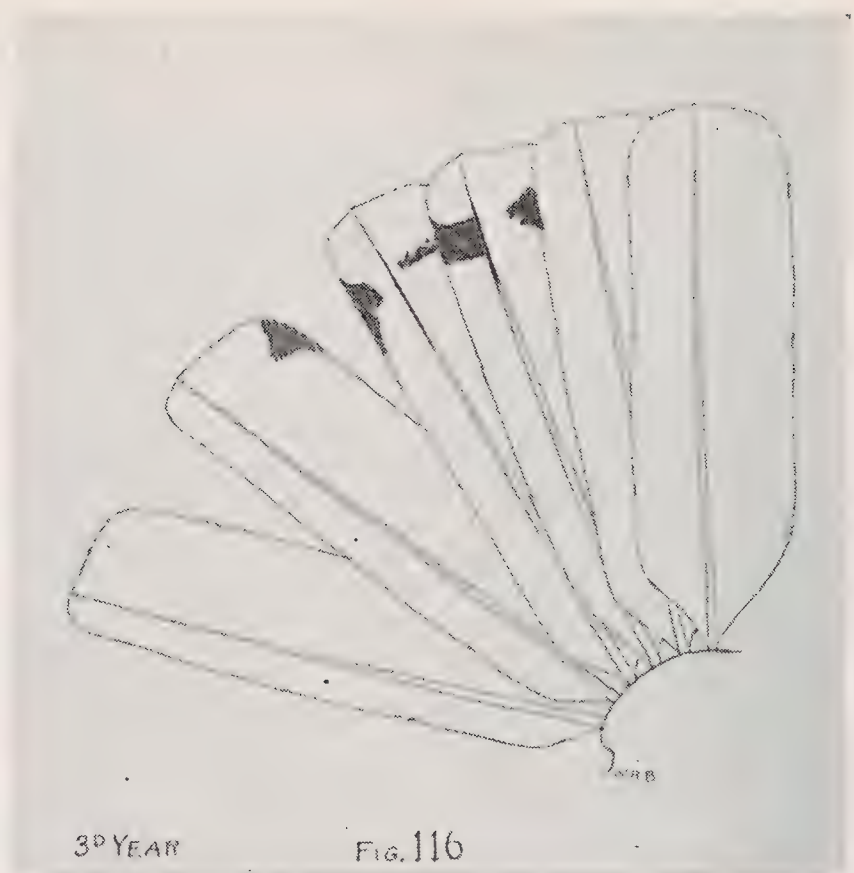
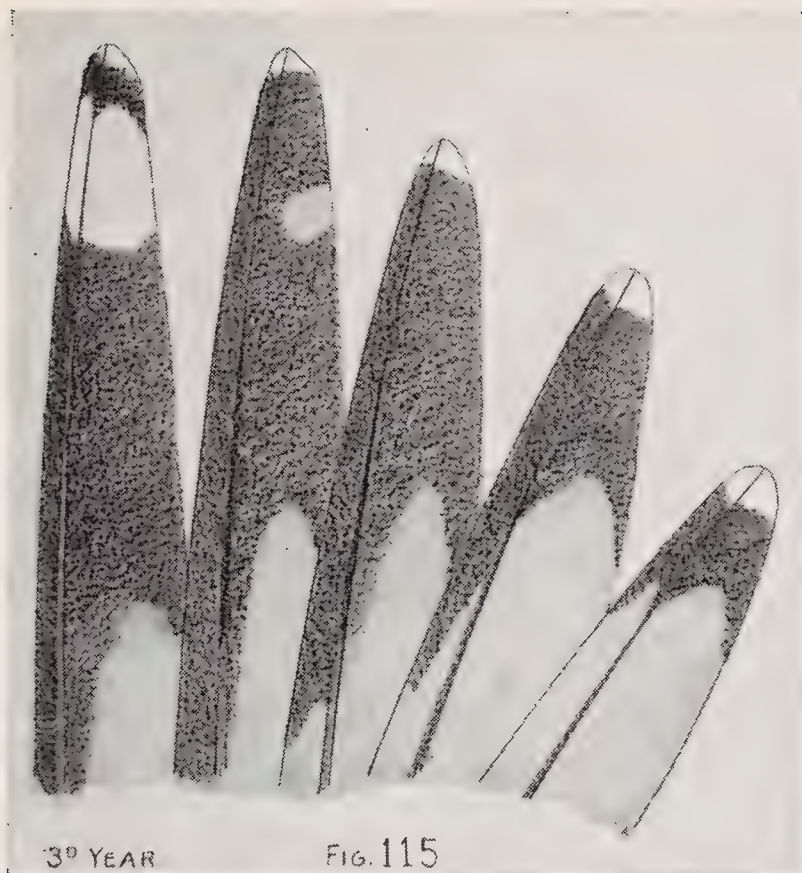
FIG. 113



3rd YEAR

FIG. 114

Larus californicus



Larus californicus



Larus cachinnans



1ST YEAR

FIG. 125



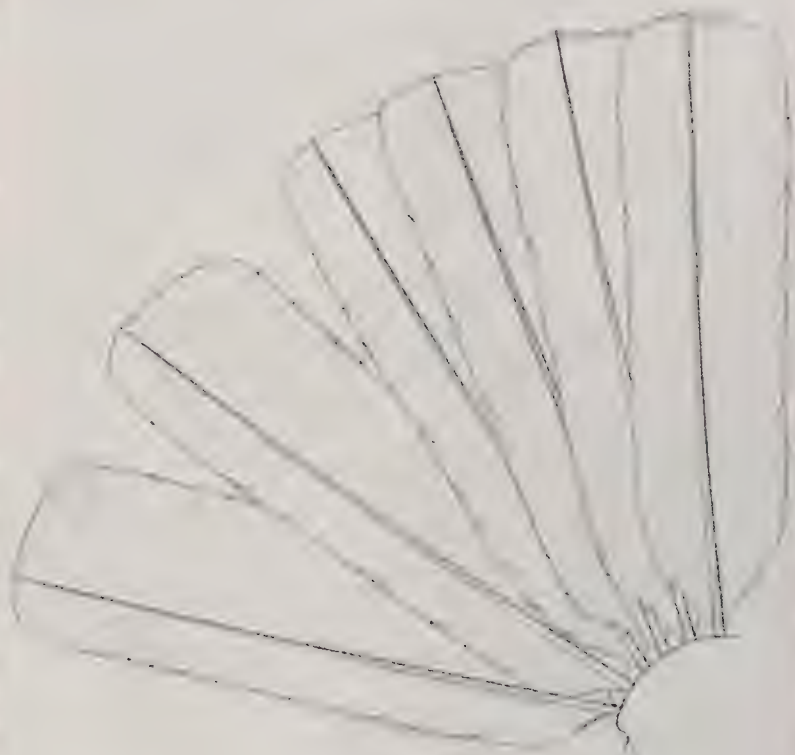
1ST YEAR

FIG. 126



ADULT

FIG. 127



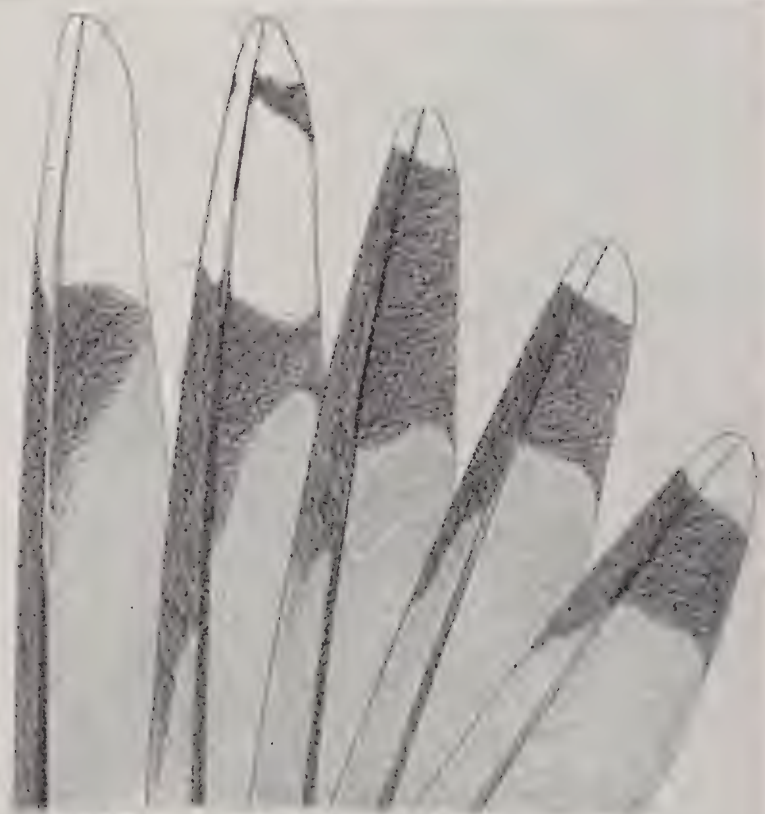
ADULT

FIG. 128



ADULT

FIG. 129



ADULT

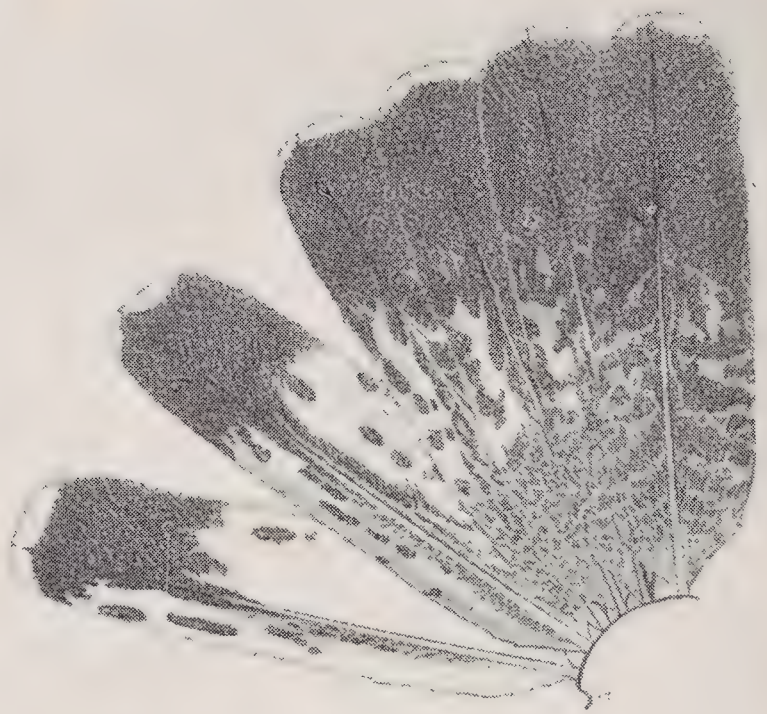
FIG. 130

Larus cachinnans



1ST YEAR

FIG. 131



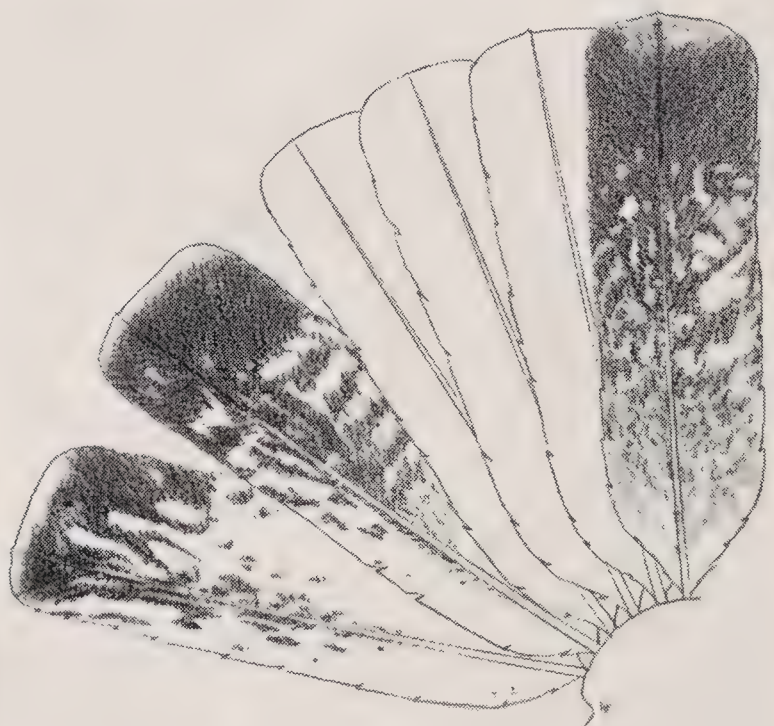
1ST YEAR

FIG. 132



2^D YEAR

FIG. 133



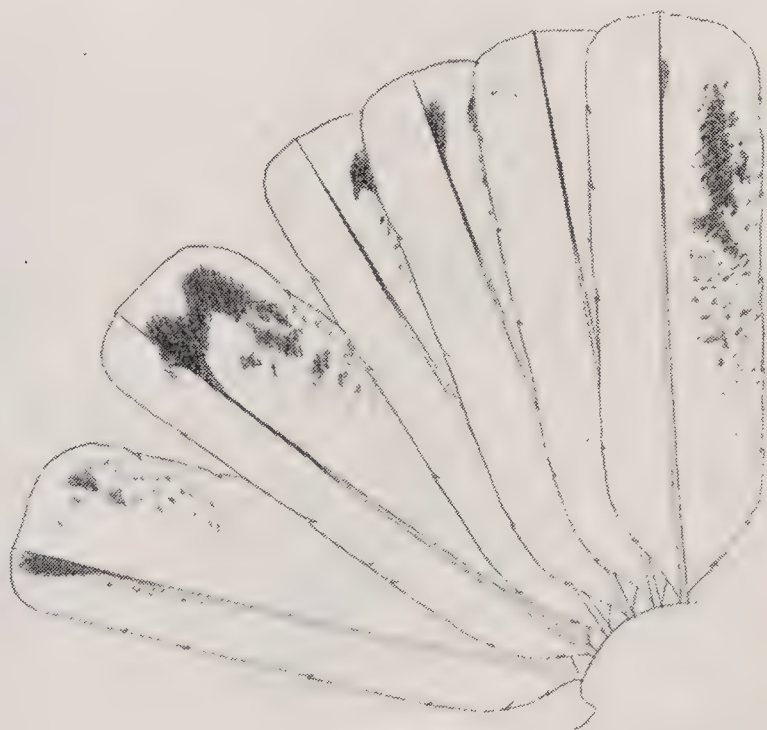
2^D YEAR + 3RD

FIG. 134



3^D YEAR.

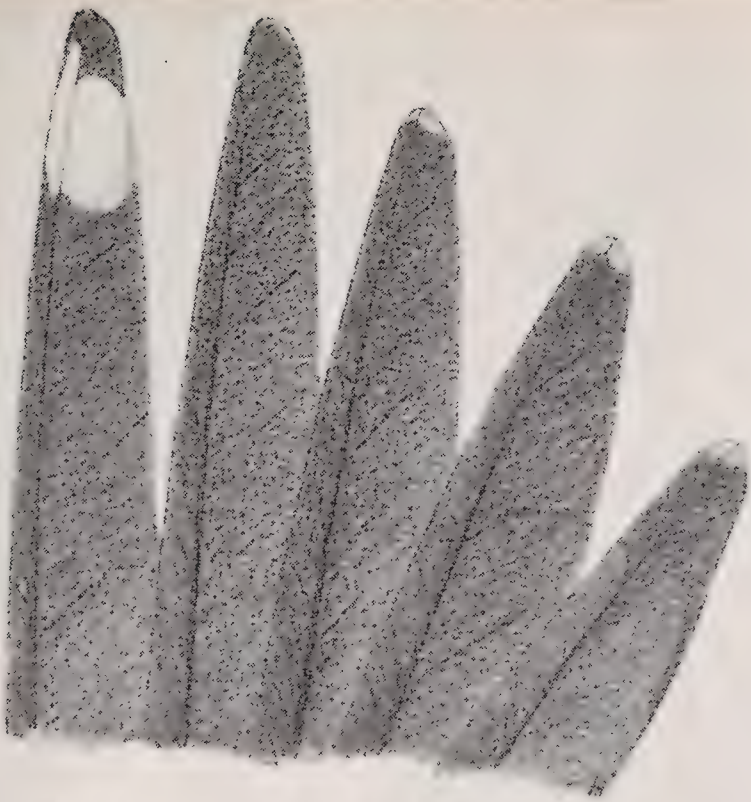
FIG. 135



3^D YEAR

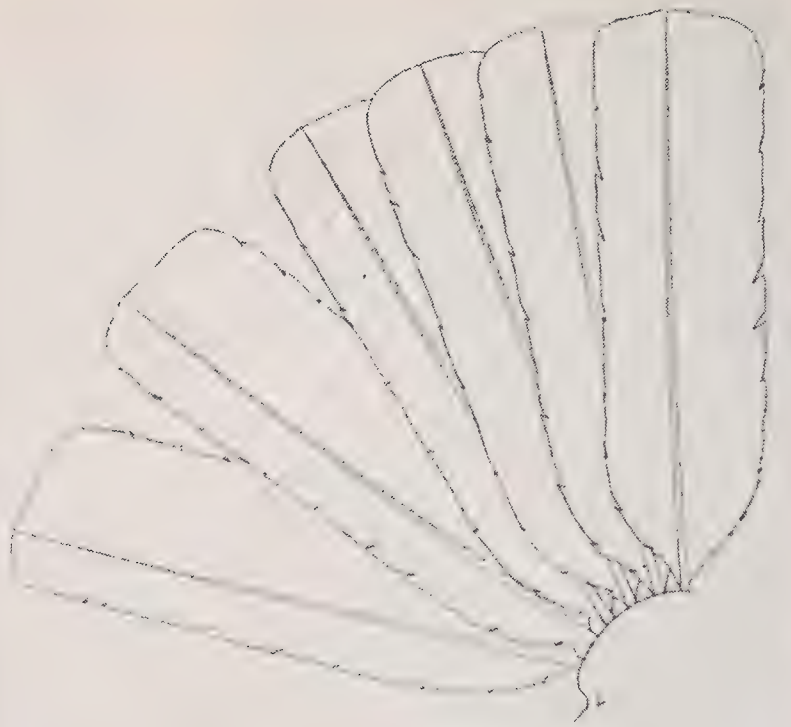
FIG. 136

Larus fuscus fuscus



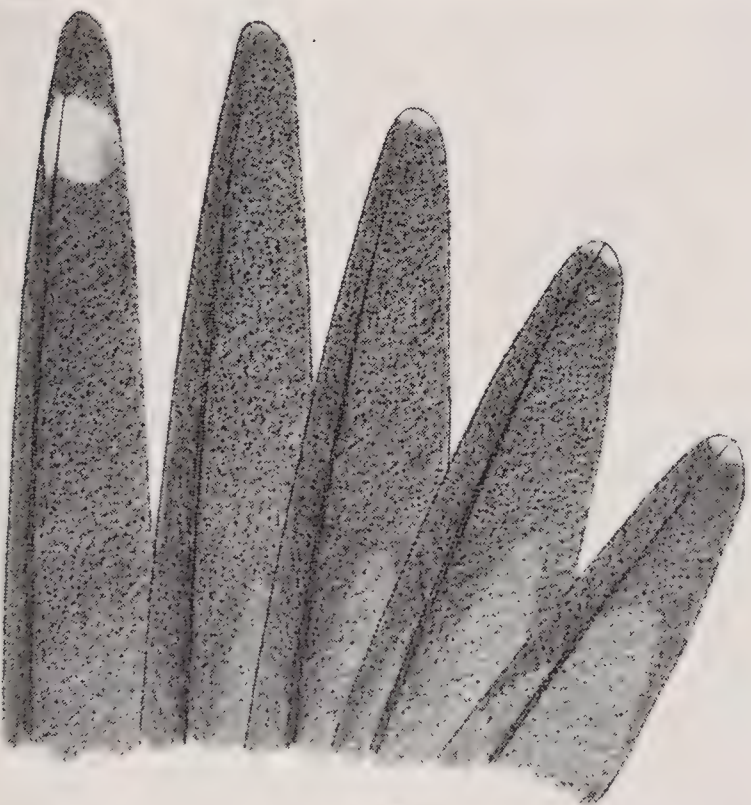
ADULT

FIG. 137



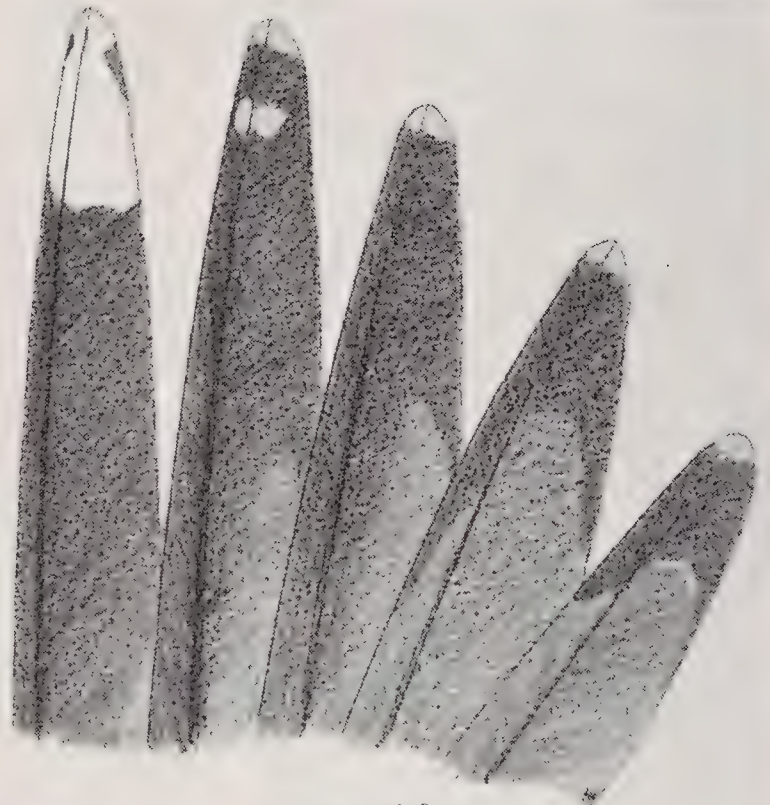
ADULT

FIG. 138



ADULT

FIG. 139



ADULT

FIG. 140



ADULT

FIG. 141



ADULT

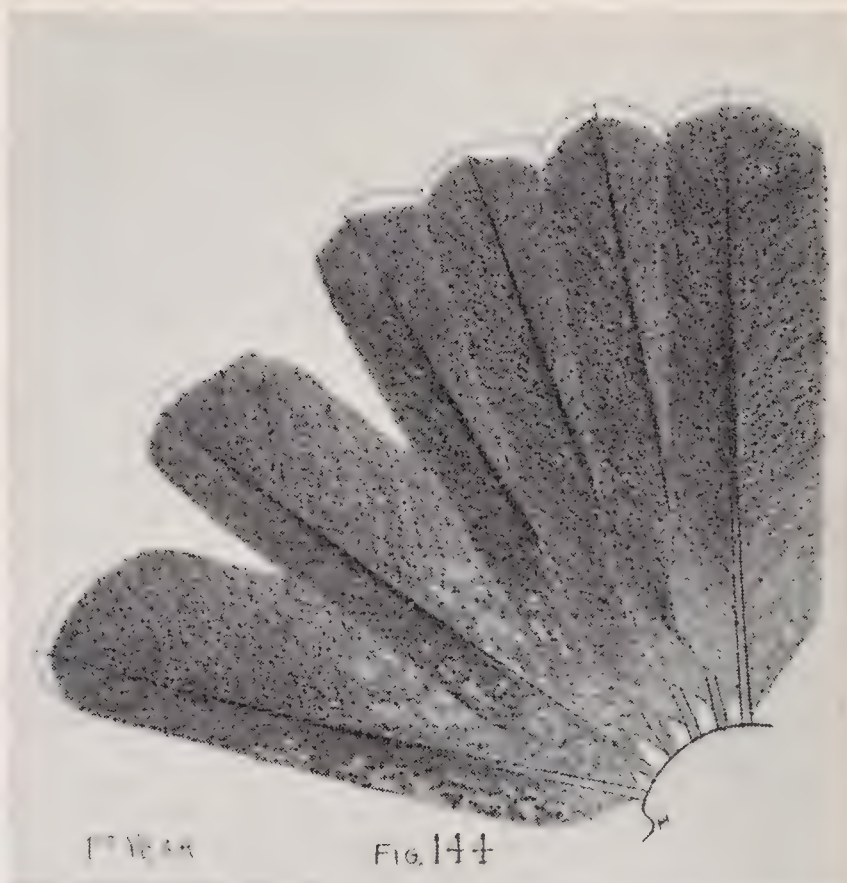
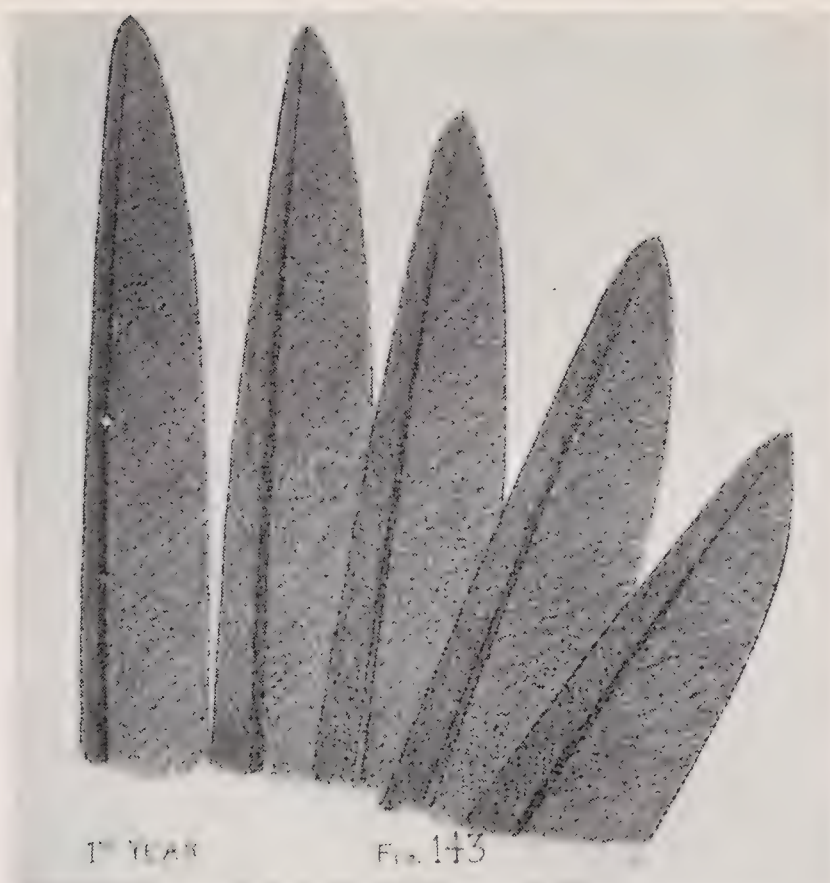
FIG. 142

Larus fuscus fuscus (Figs. 137, 138)

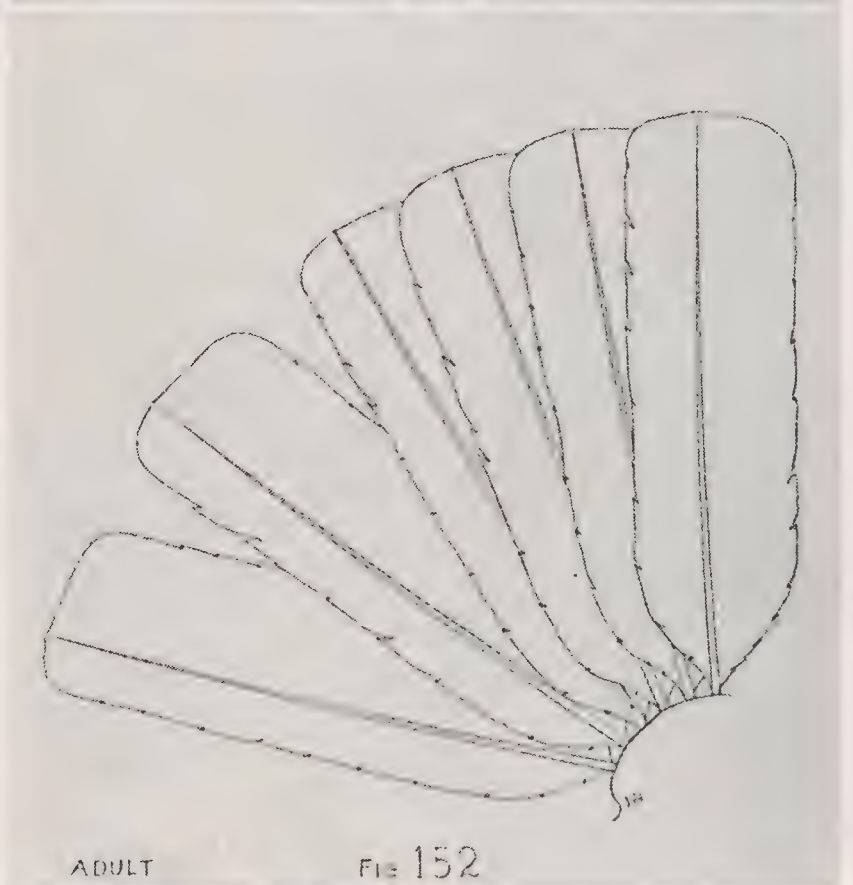
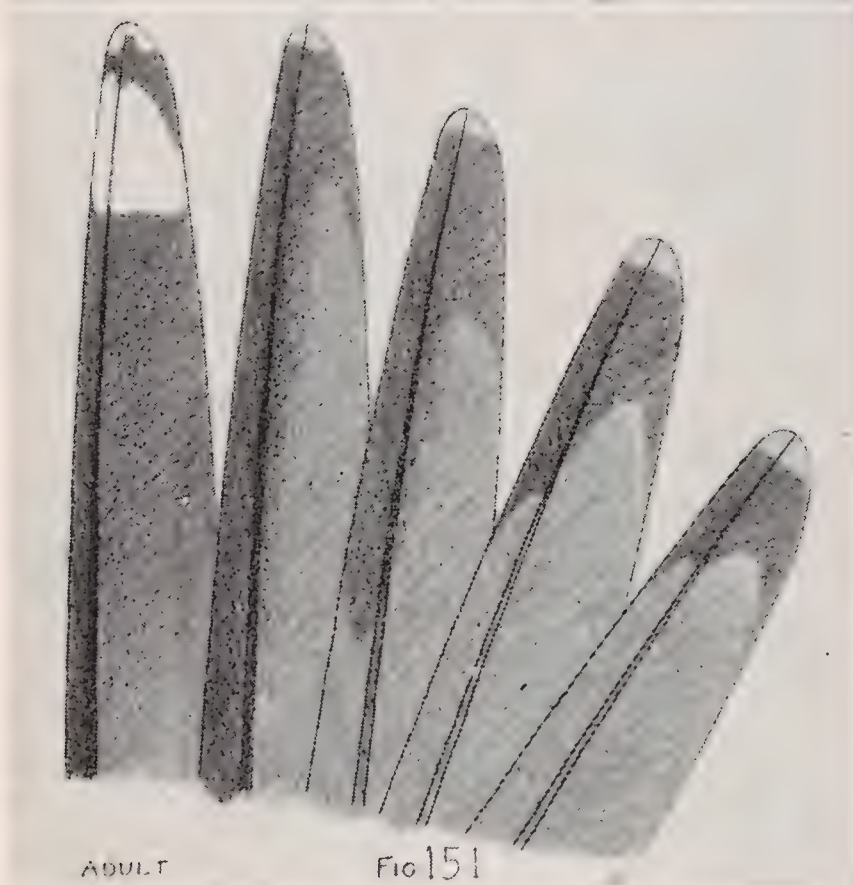
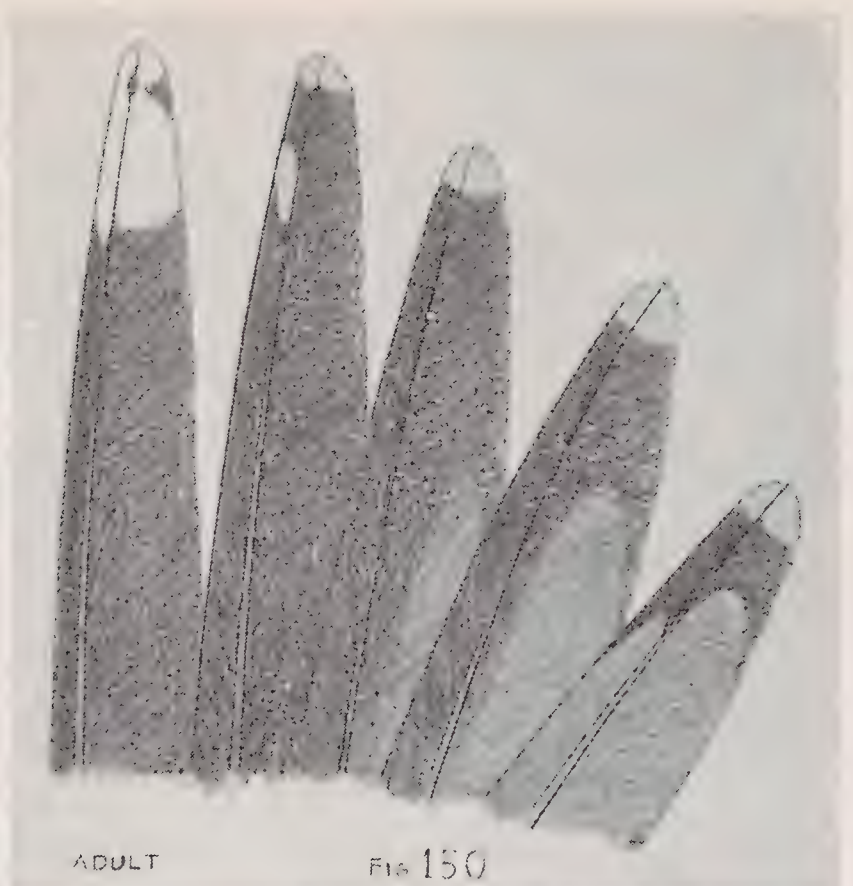
Larus fuscus atlantis (Fig. 139)

Larus fuscus taimyrensis (Fig. 140)

Larus fuscus affinis (Figs. 141, 142)



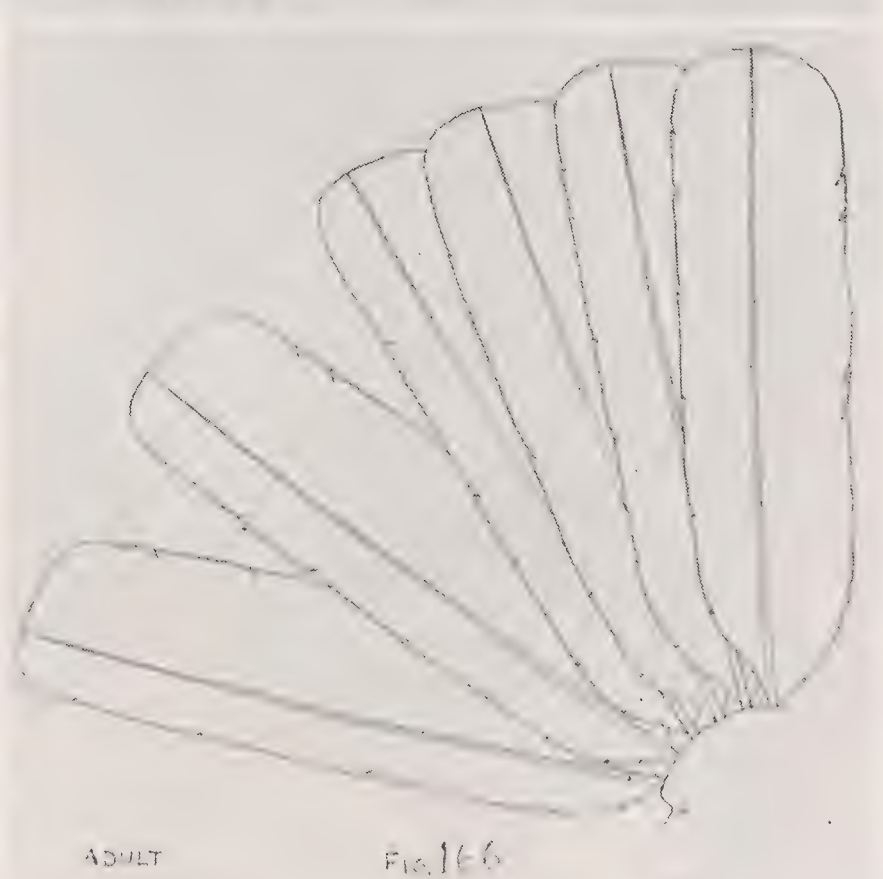
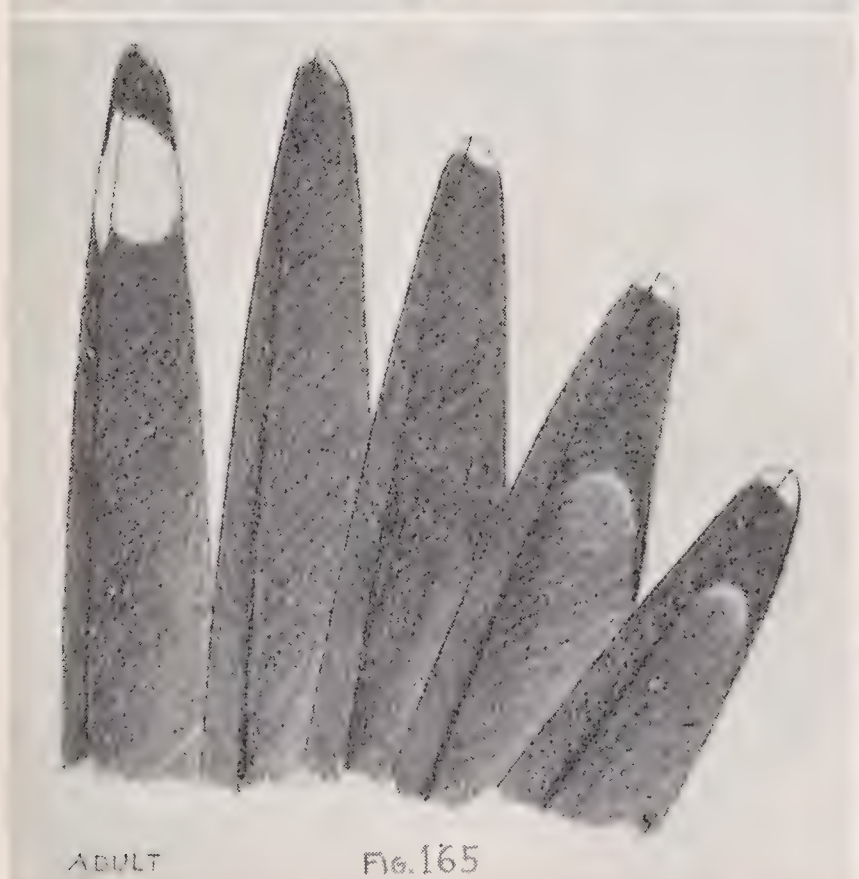
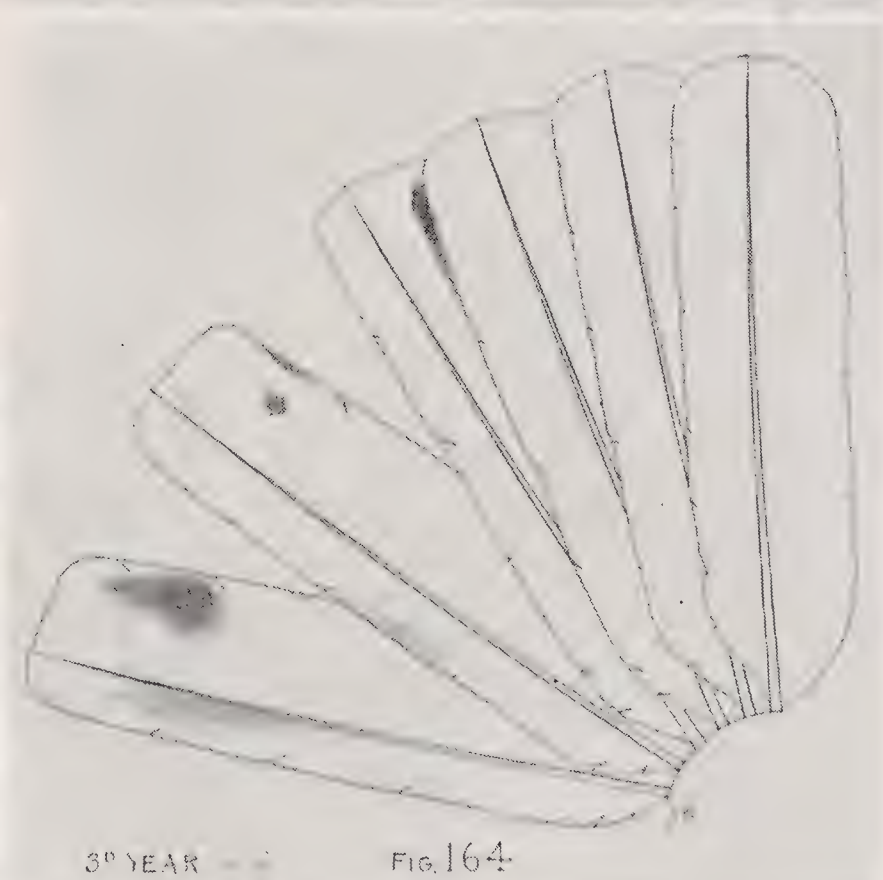
Larus occidentalis occidentalis



Larus occidentalis occidentalis (Figs. 150 to 153)
Larus occidentalis livens (Figs. 149, 154)



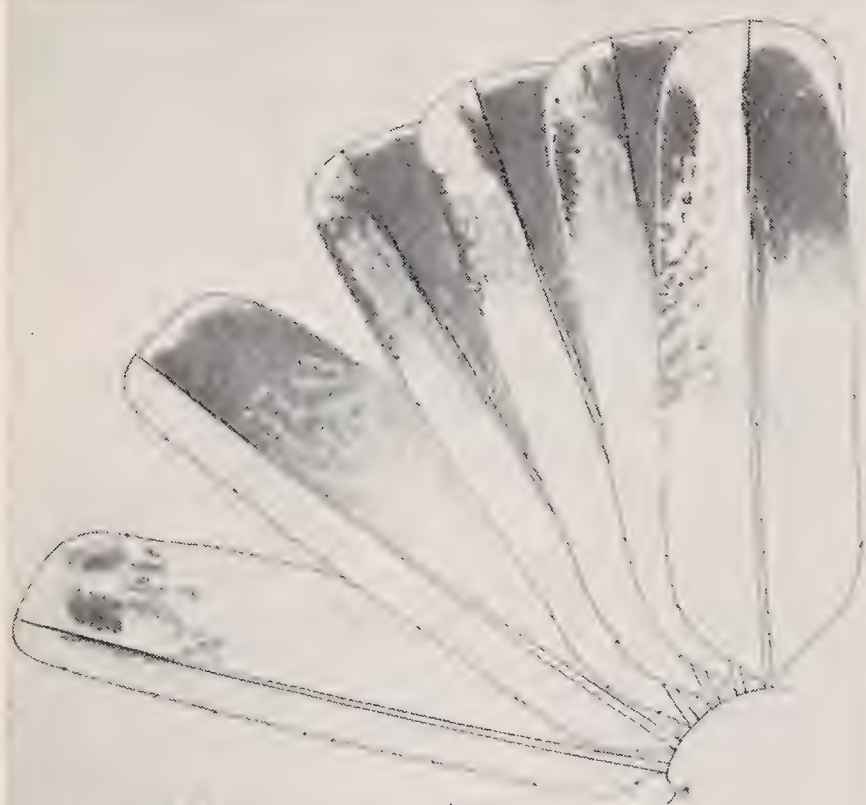
Larus dominicanus



Larus dominicanus

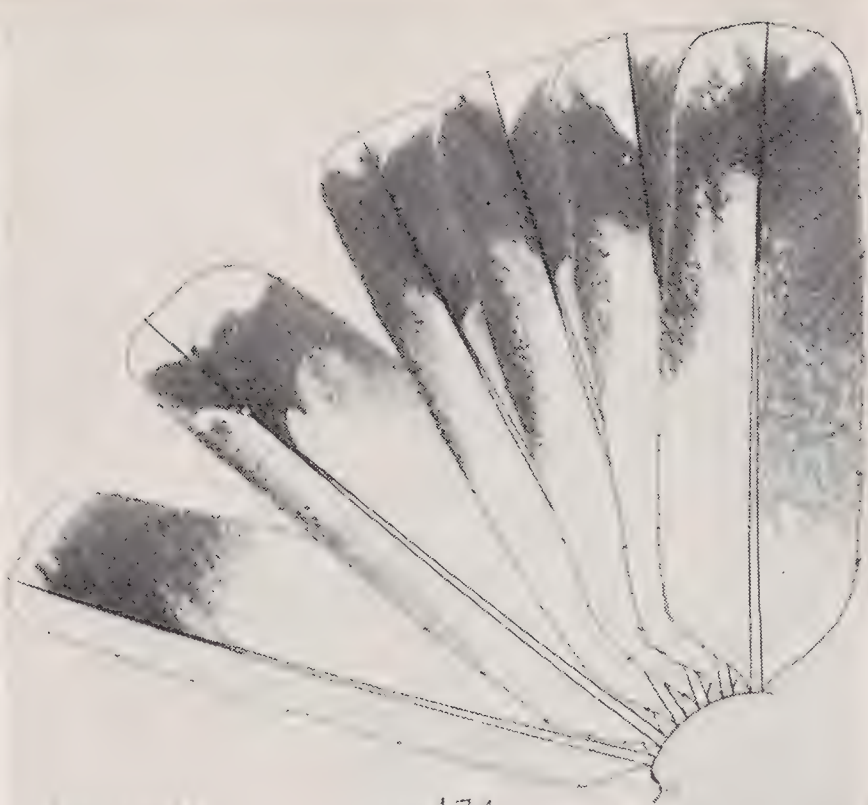


Larus schistisagus



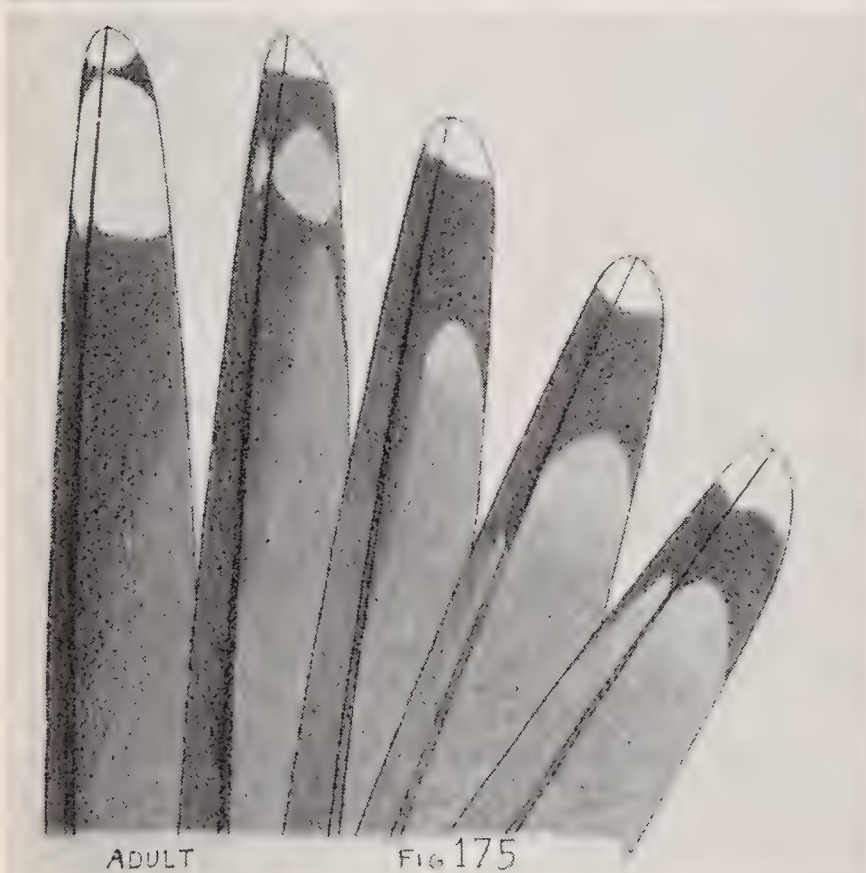
2^d YEAR

FIG 173



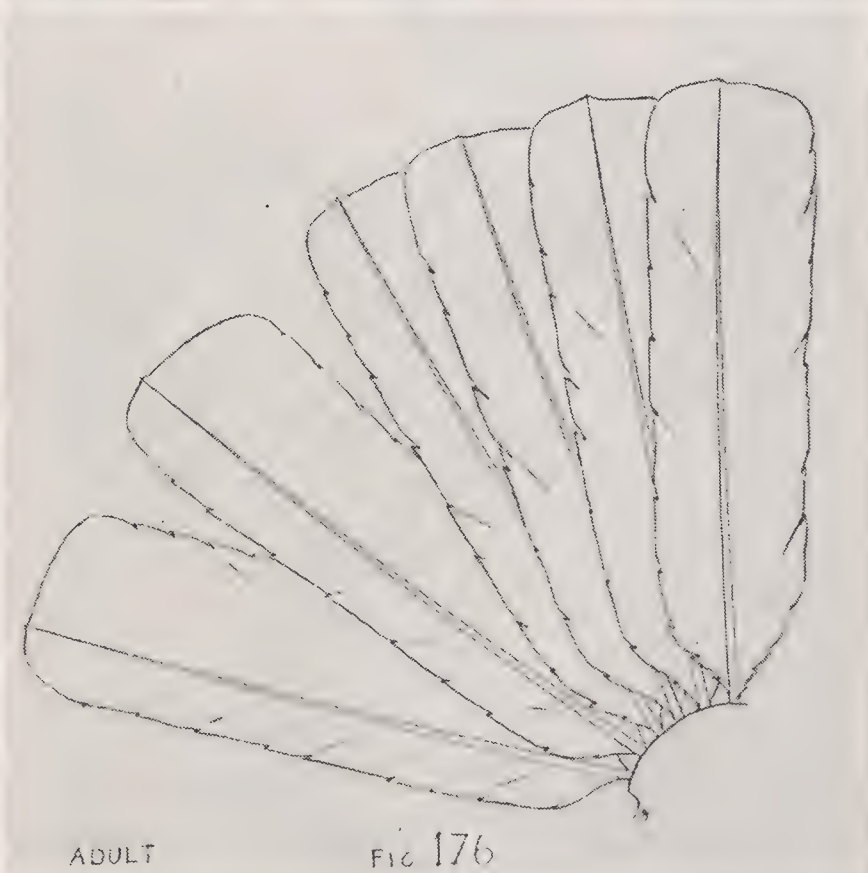
3^d YEAR

FIG 174



ADULT

FIG 175



ADULT

FIG 176



ADULT

FIG 177



ADULT

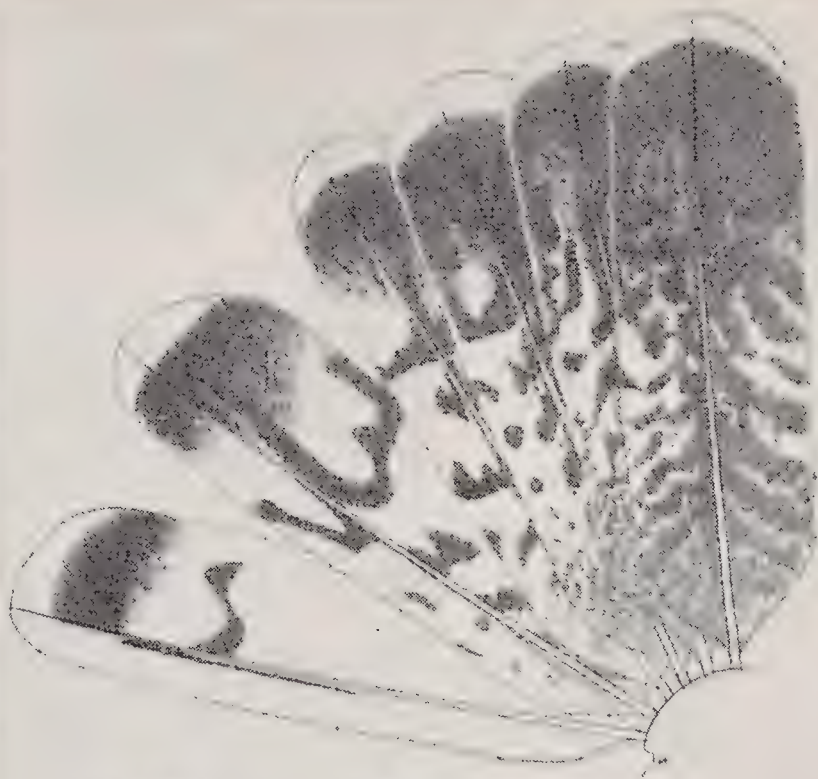
FIG 178

Larus schistisagus



1st YEAR

FIG. 179



1st YEAR

FIG. 180



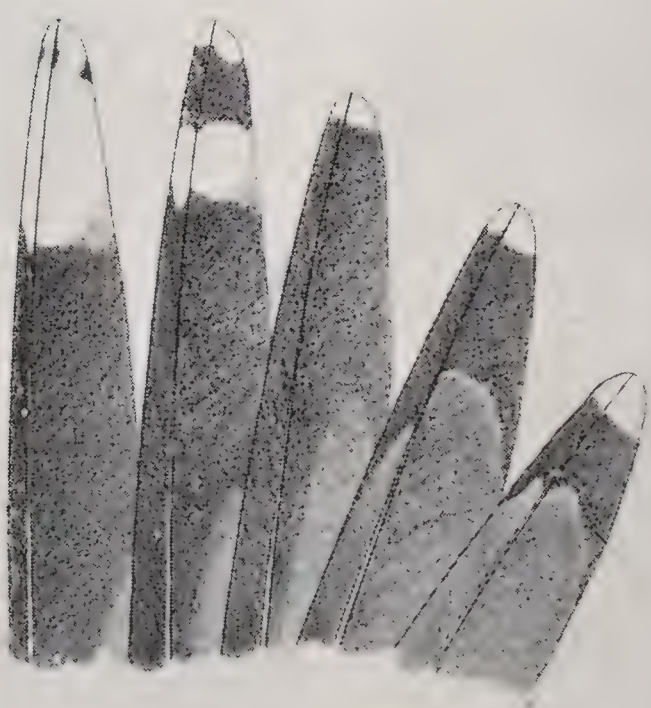
2nd YEAR

FIG. 181



2nd YEAR

FIG. 182



3rd YEAR

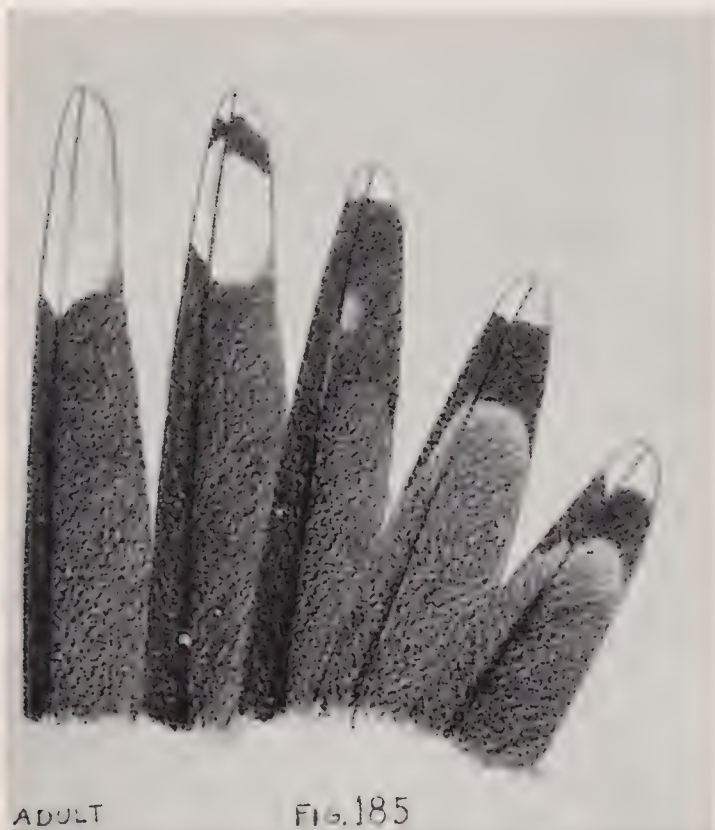
FIG. 183



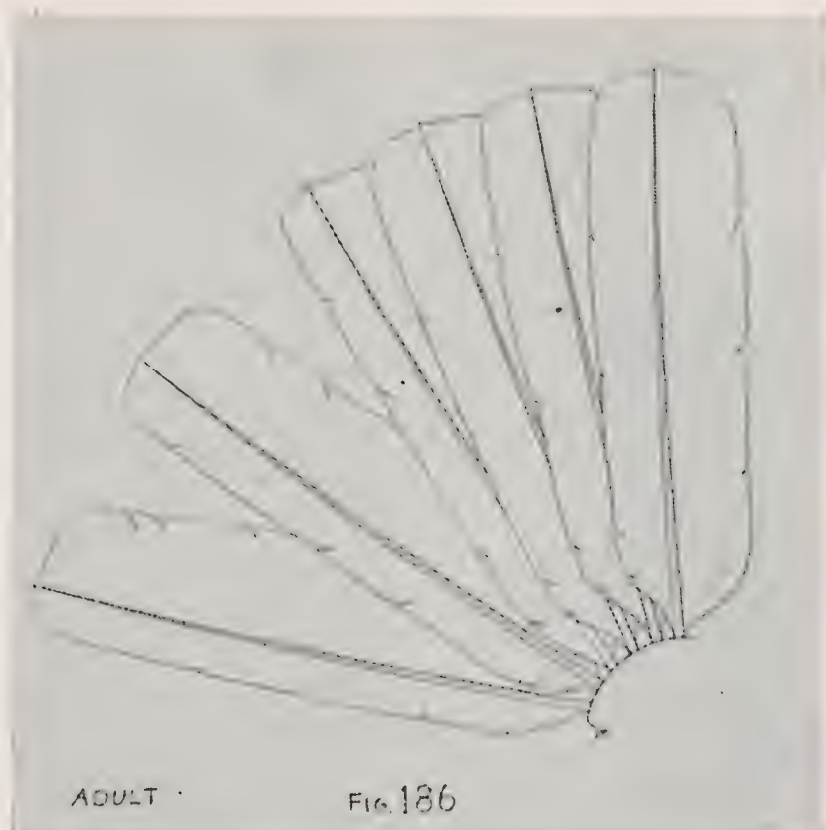
3rd YEAR

FIG. 184

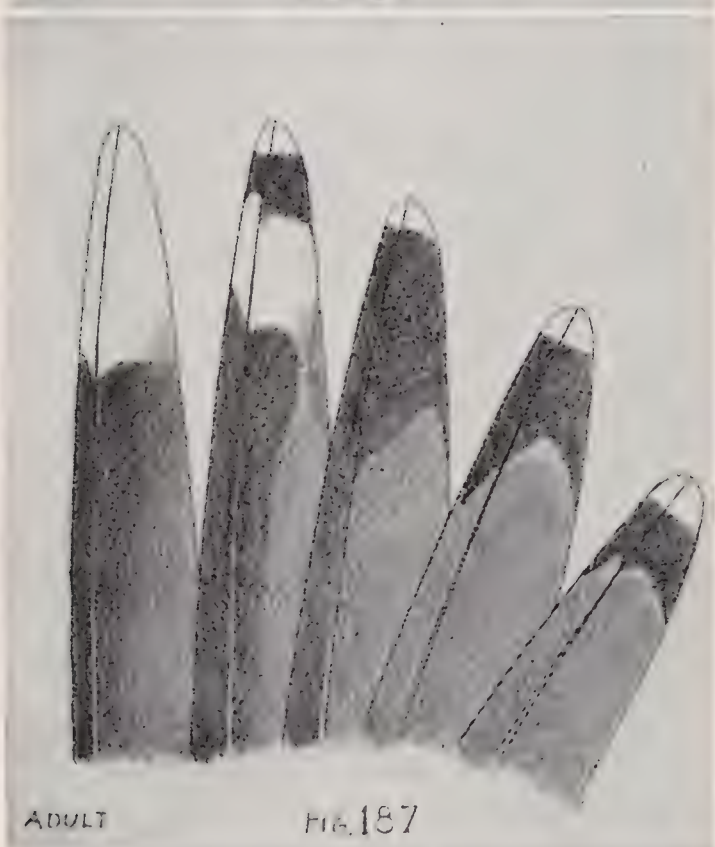
Larus marinus



ADULT FIG. 185



ADULT FIG. 186



ADULT FIG. 187



ADULT FIG. 188

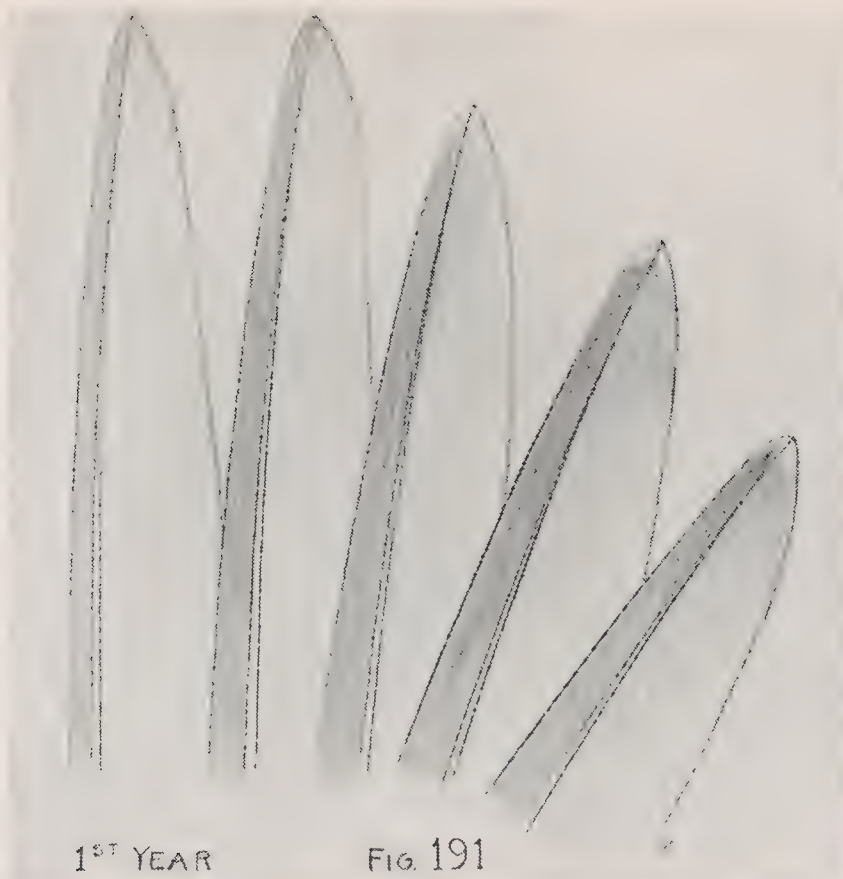


ADULT FIG. 189



1ST YEAR FIG. 190

Larus marinus



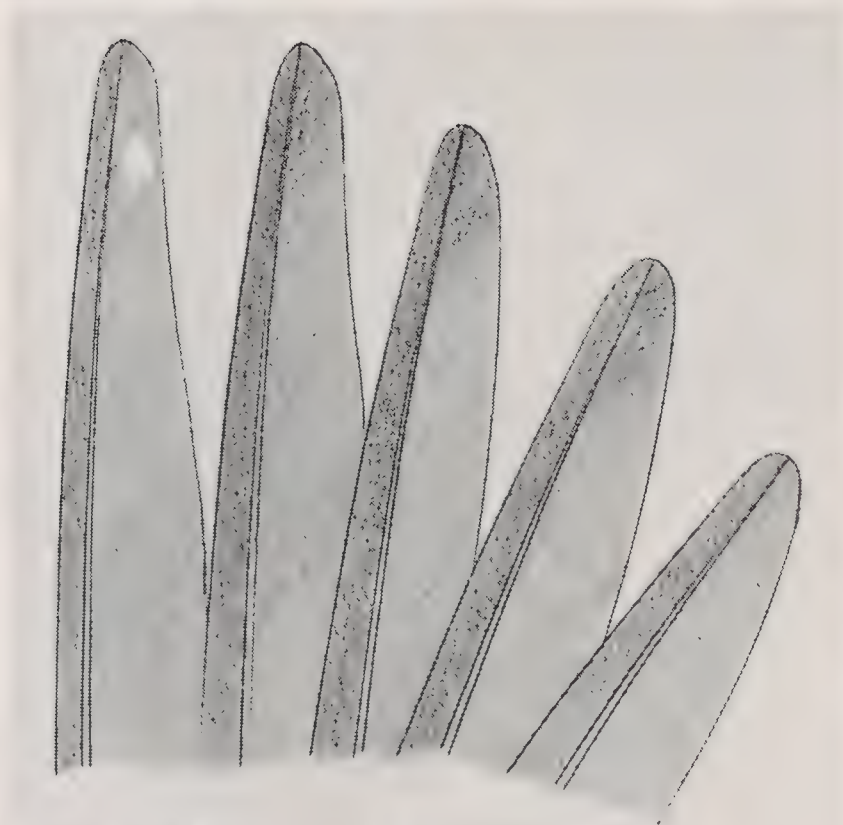
1ST YEAR

FIG. 191



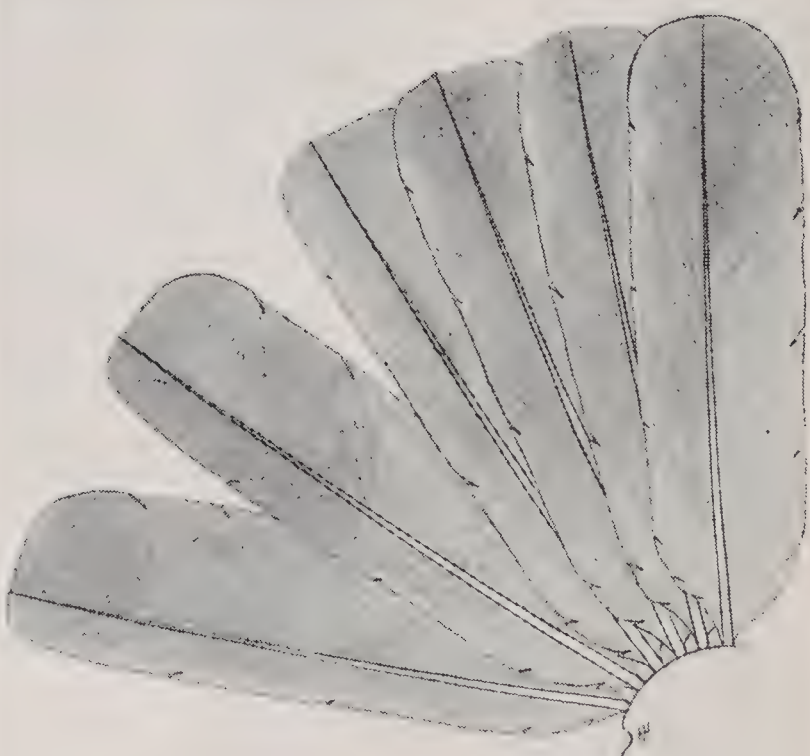
1ST YEAR

FIG. 192



2^D YEAR

FIG. 193



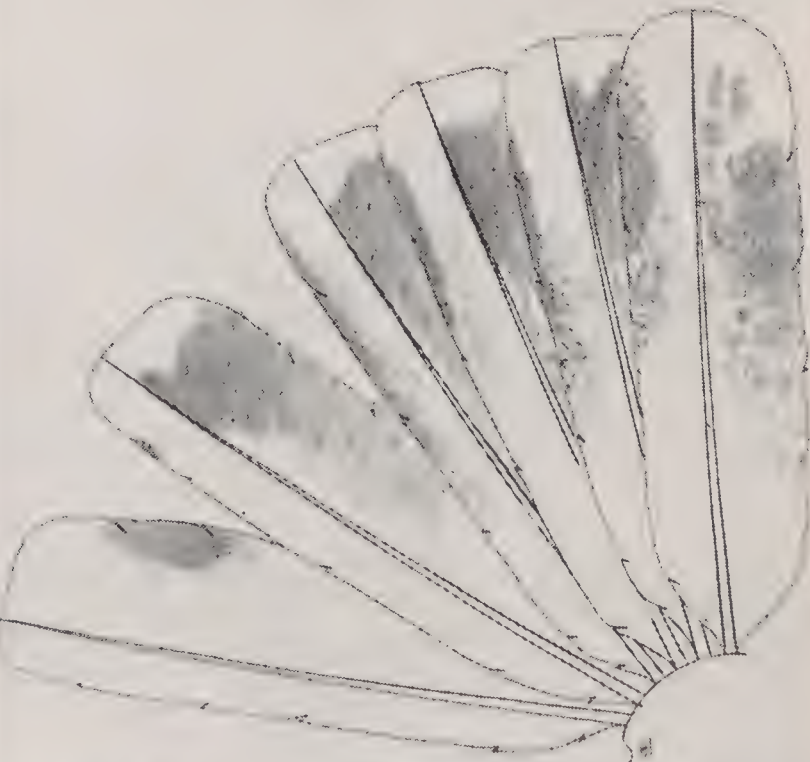
2^D YEAR

FIG. 194



2^D YEAR

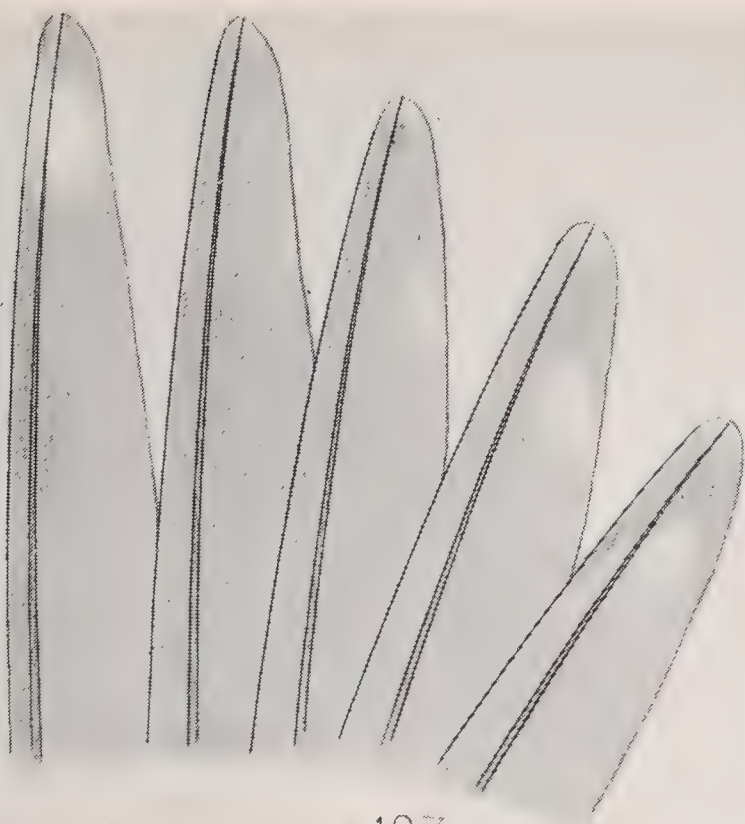
FIG. 195



3^D YEAR

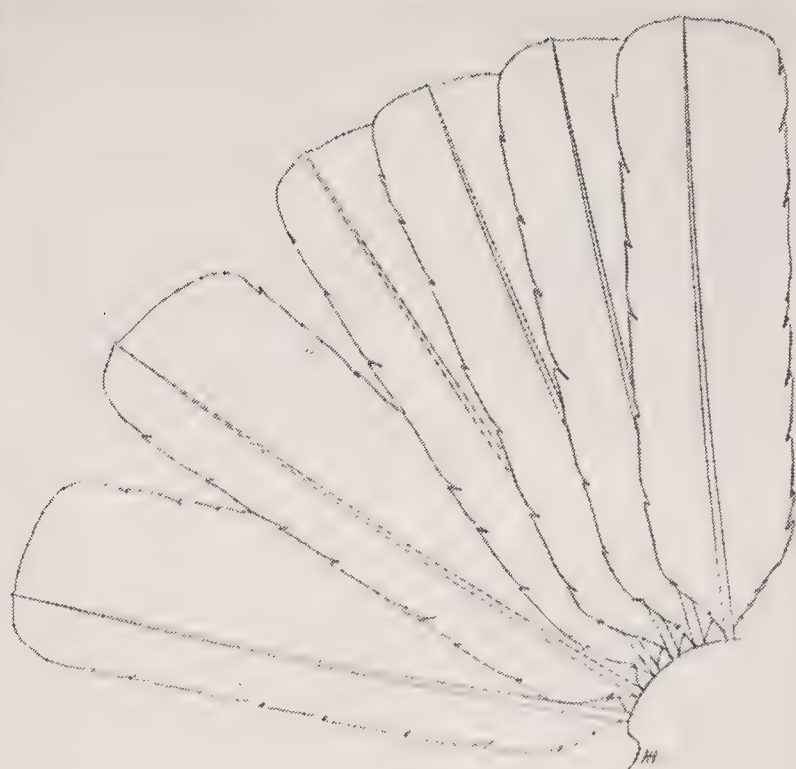
FIG. 196

Larus glaucescens



ADULT

FIG. 197



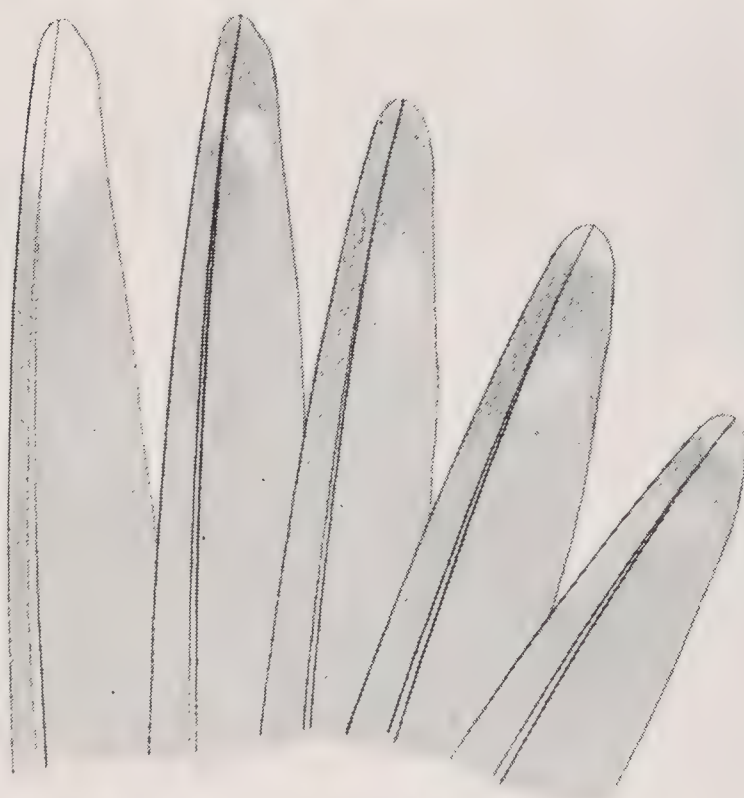
ADULT

FIG 198



ADULT

FIG. 199



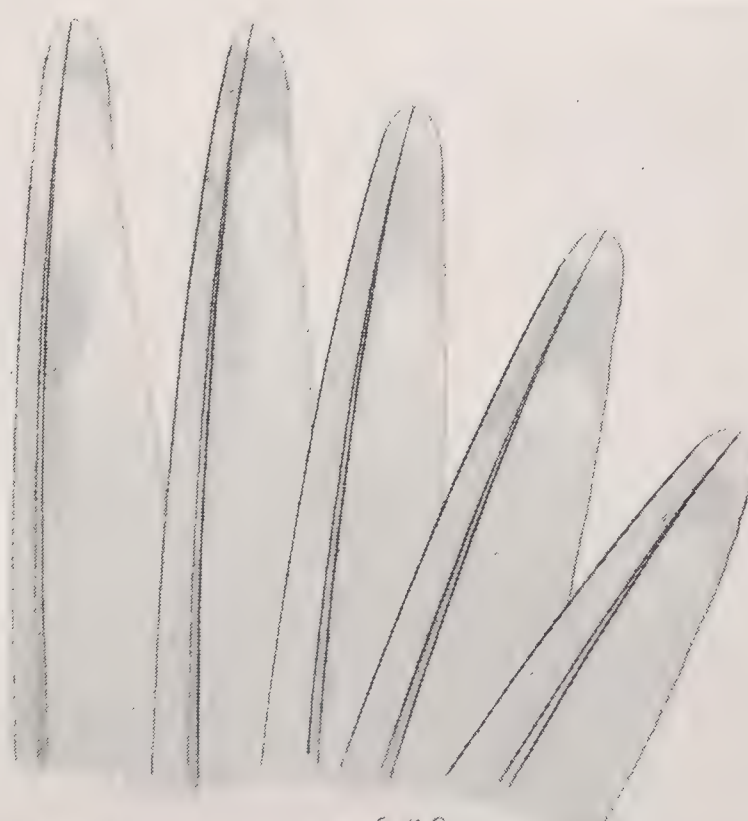
ADULT

FIG 200



ADULT

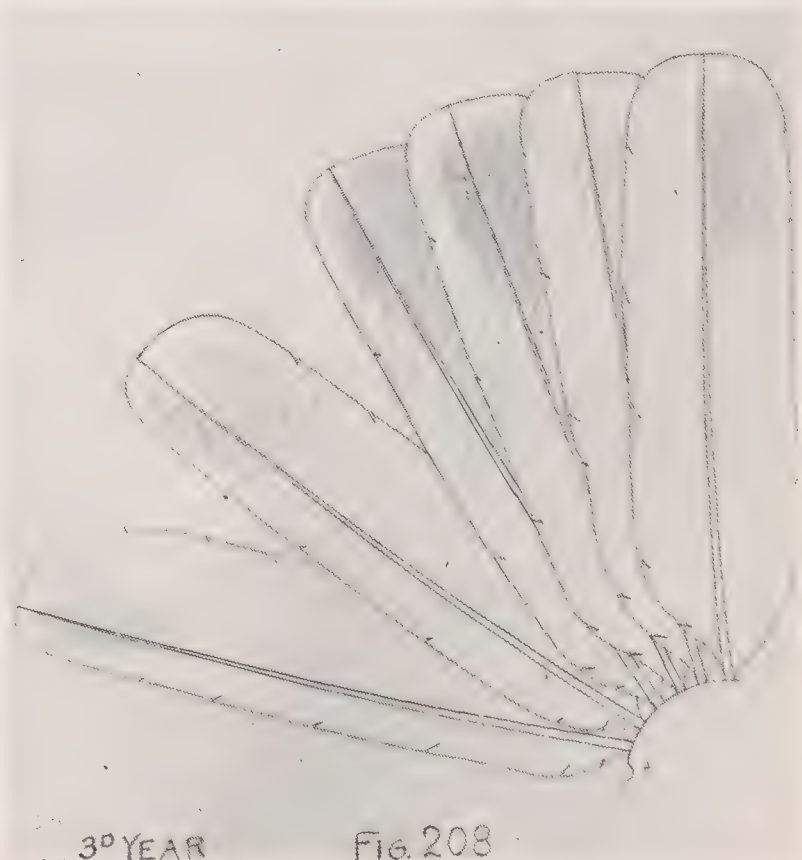
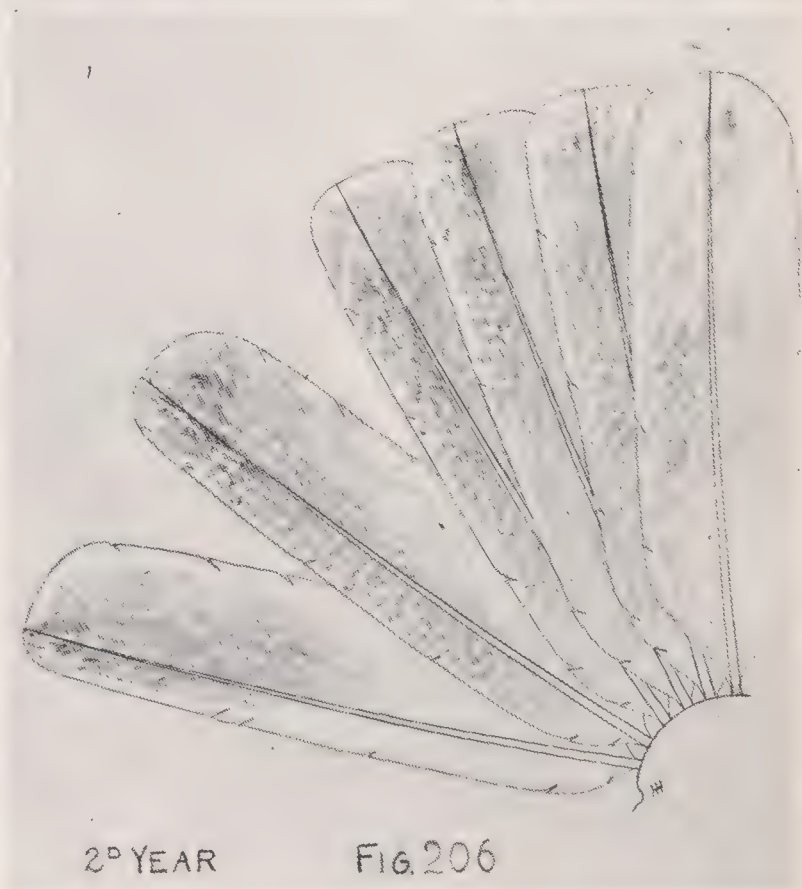
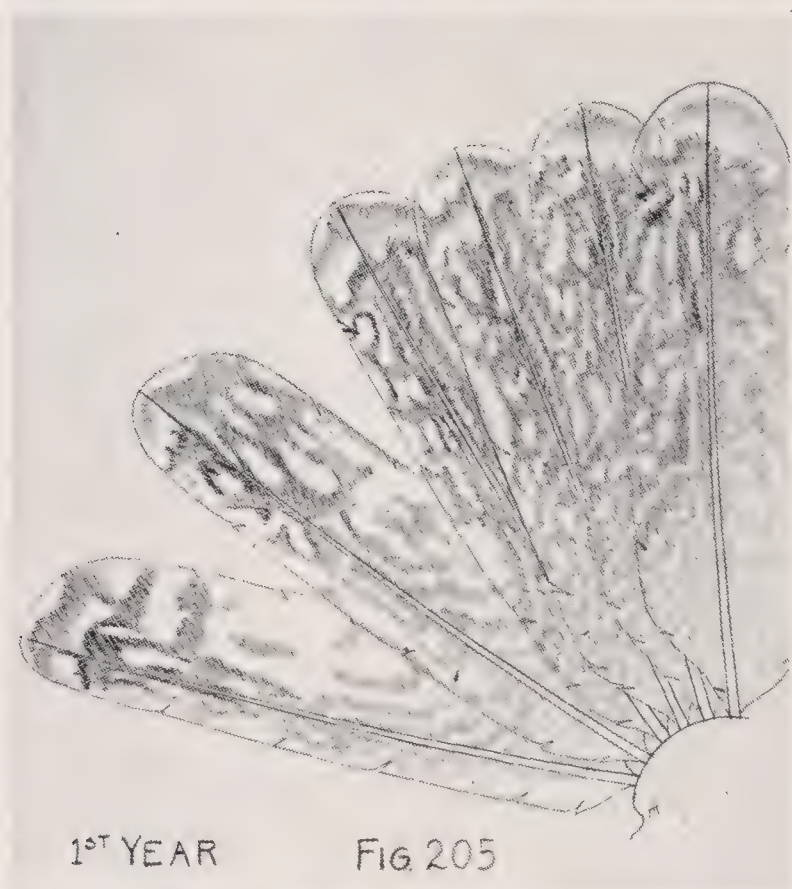
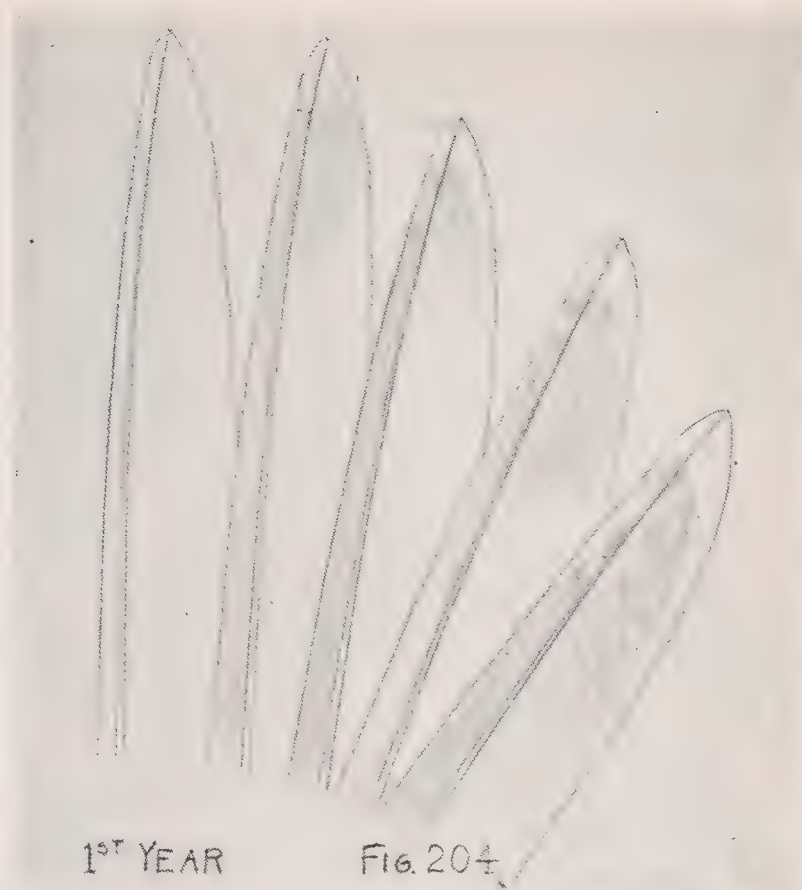
FIG 201



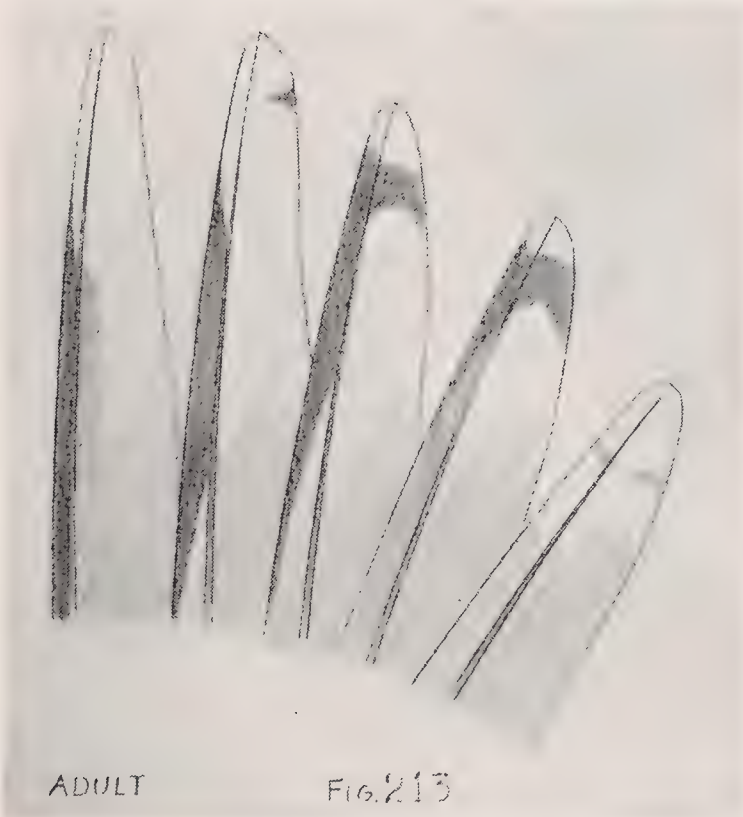
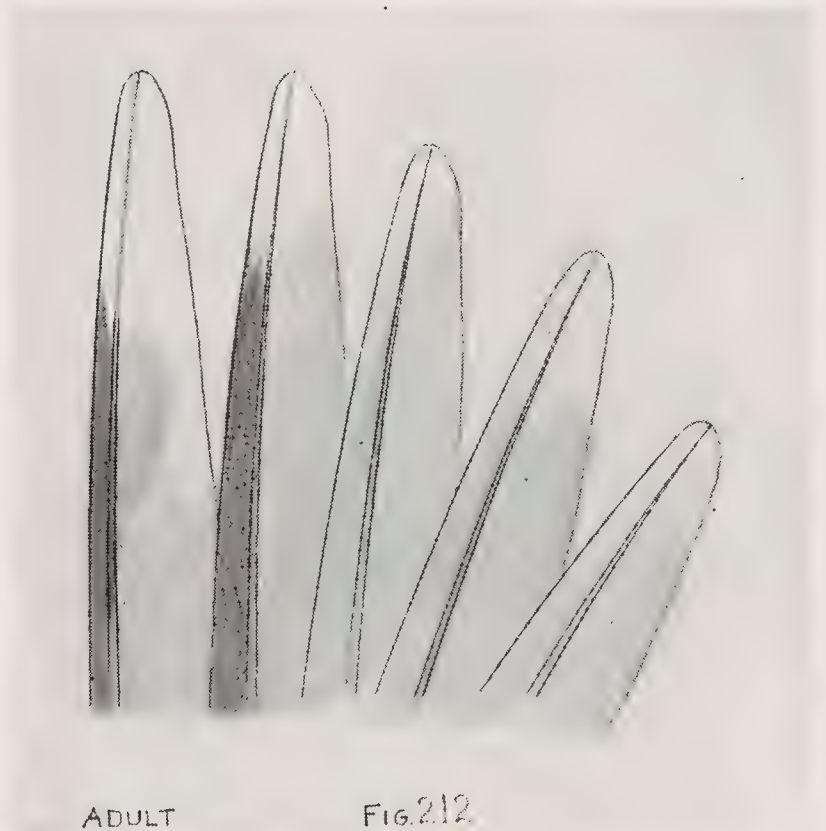
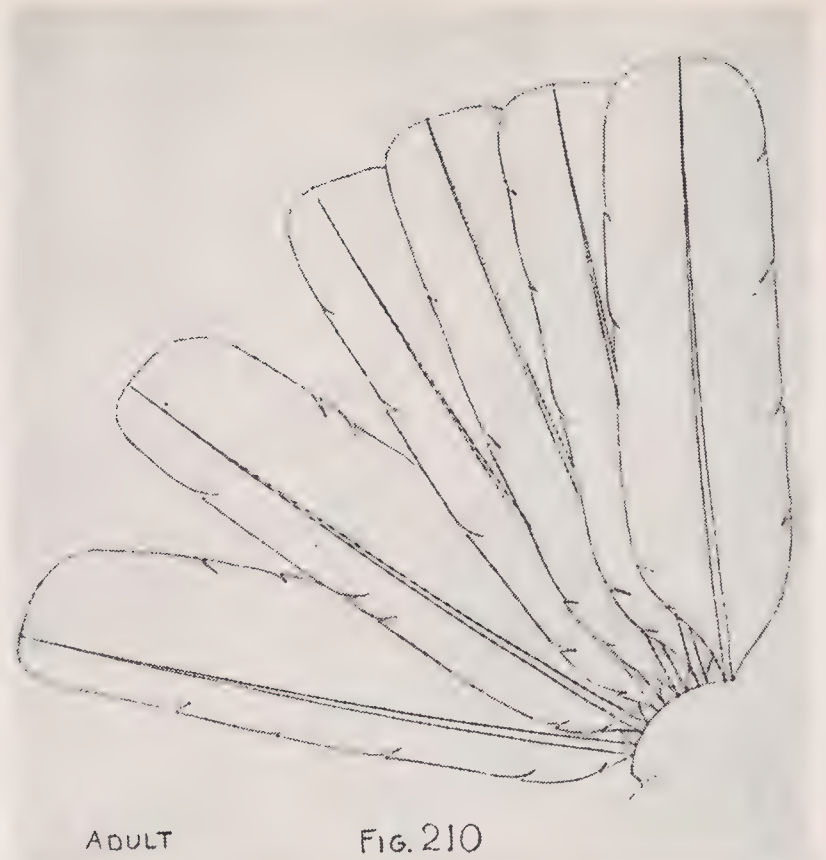
ADULT

FIG 202

Larus glaucescens



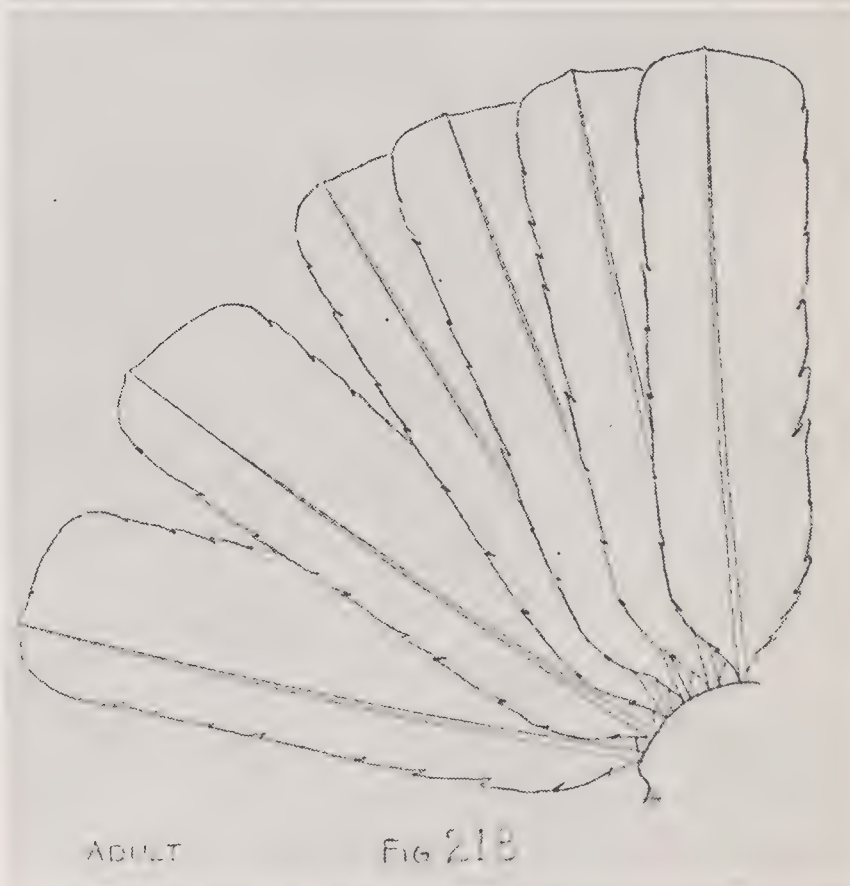
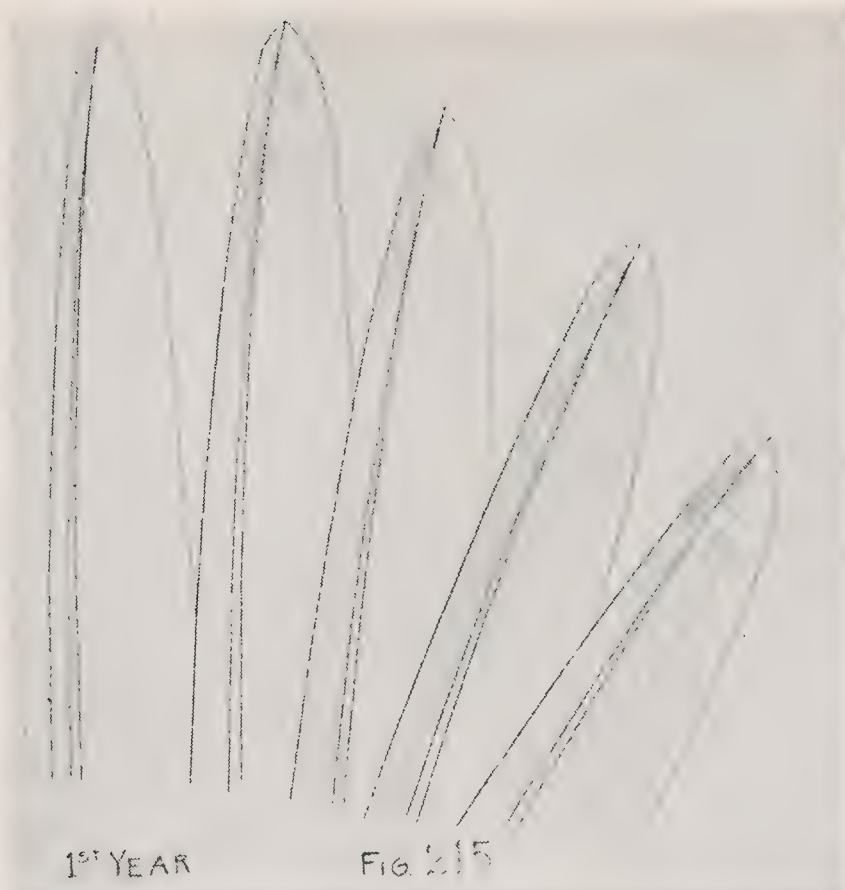
Larus hyperboreus



Larus hyperboreus (Figs. 209, 210)

Larus "nelsoni" (Figs. 211, 212)

Larus "kumlienii" (Figs. 213, 214)





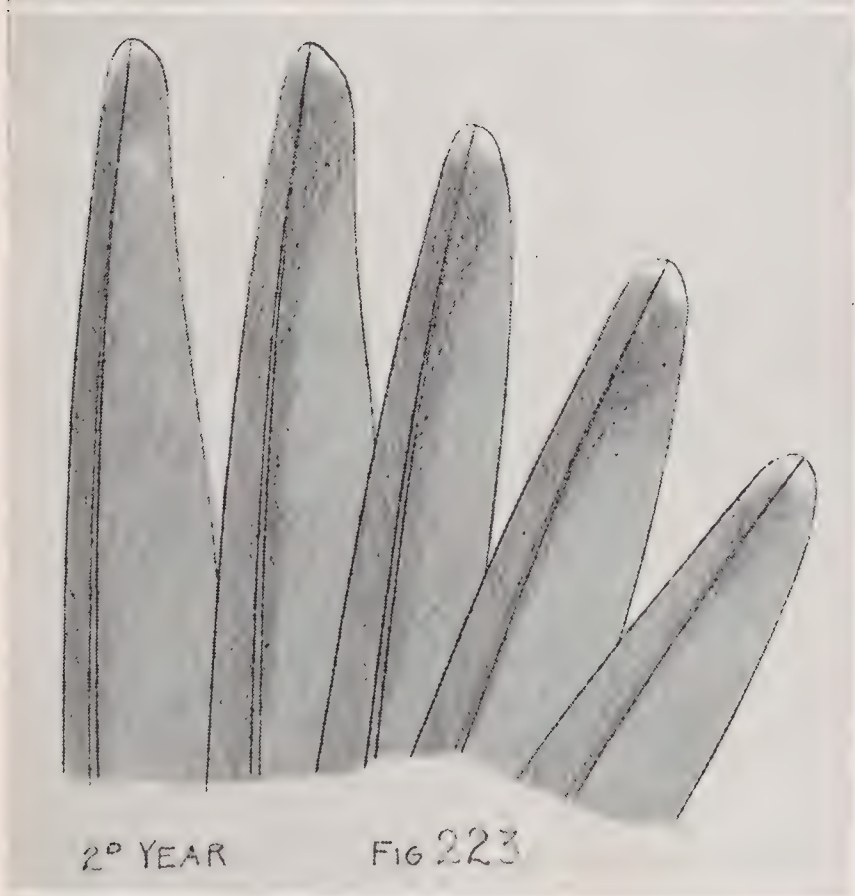
1ST YEAR

FIG 221



1ST YEAR

FIG. 222



2ND YEAR

FIG 223



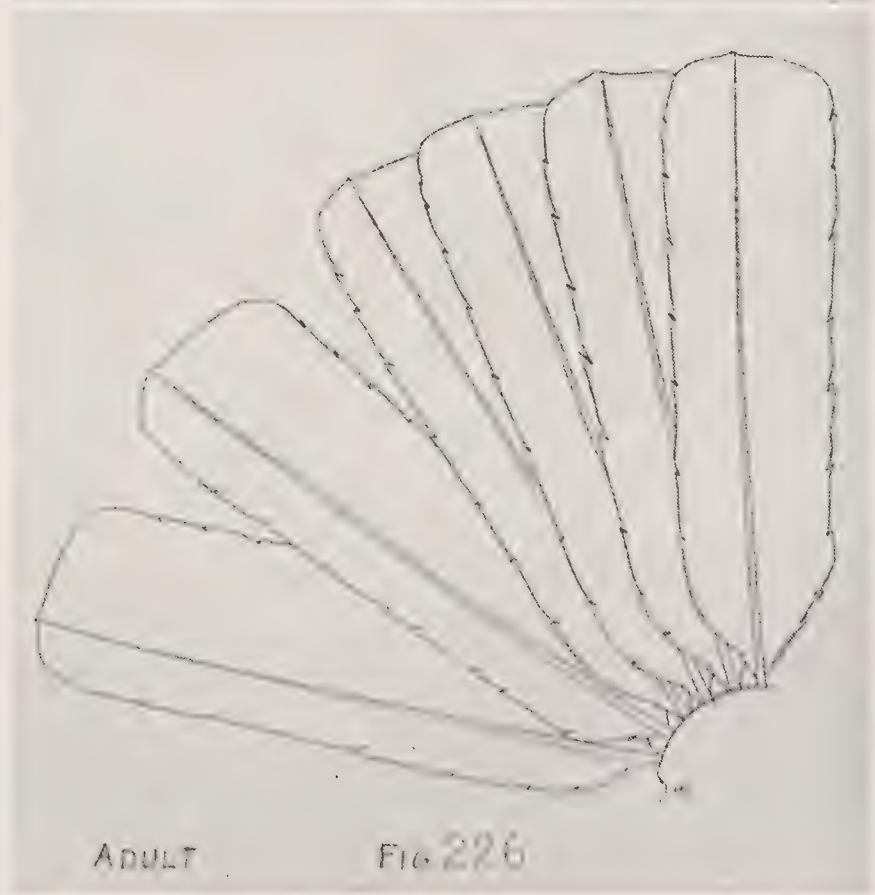
2ND YEAR

FIG 224



ADULT

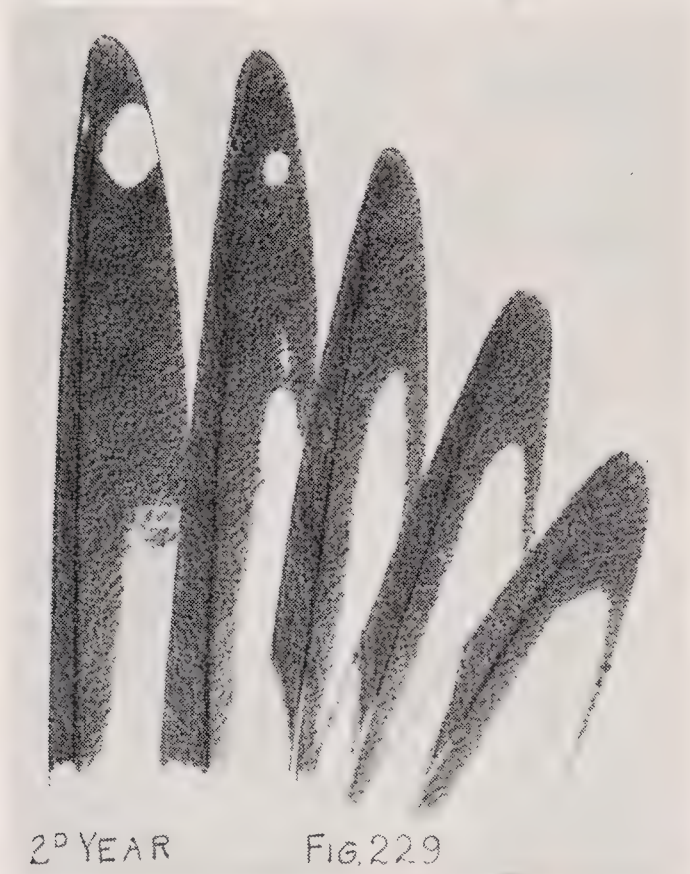
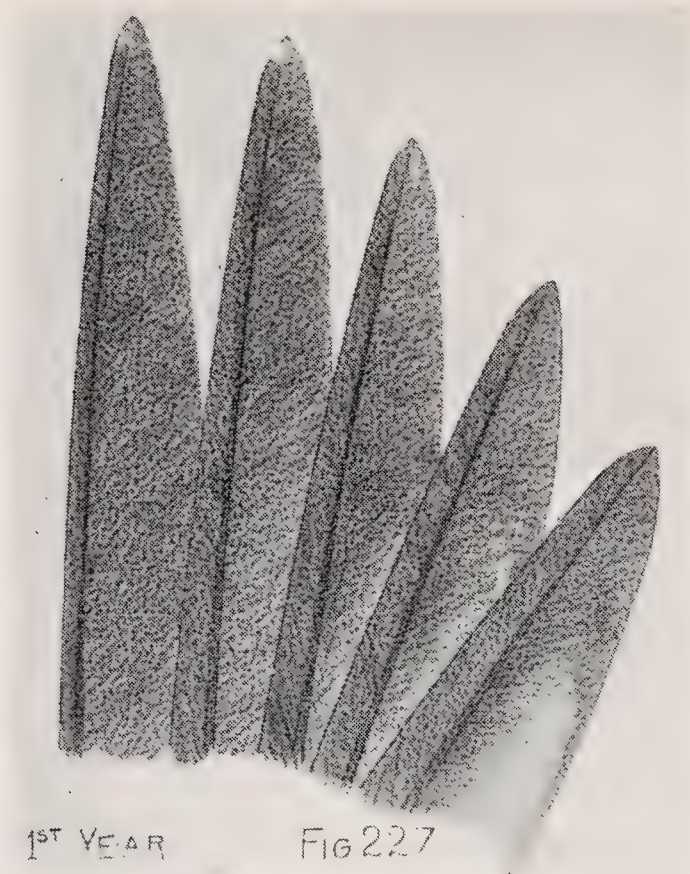
FIG 225



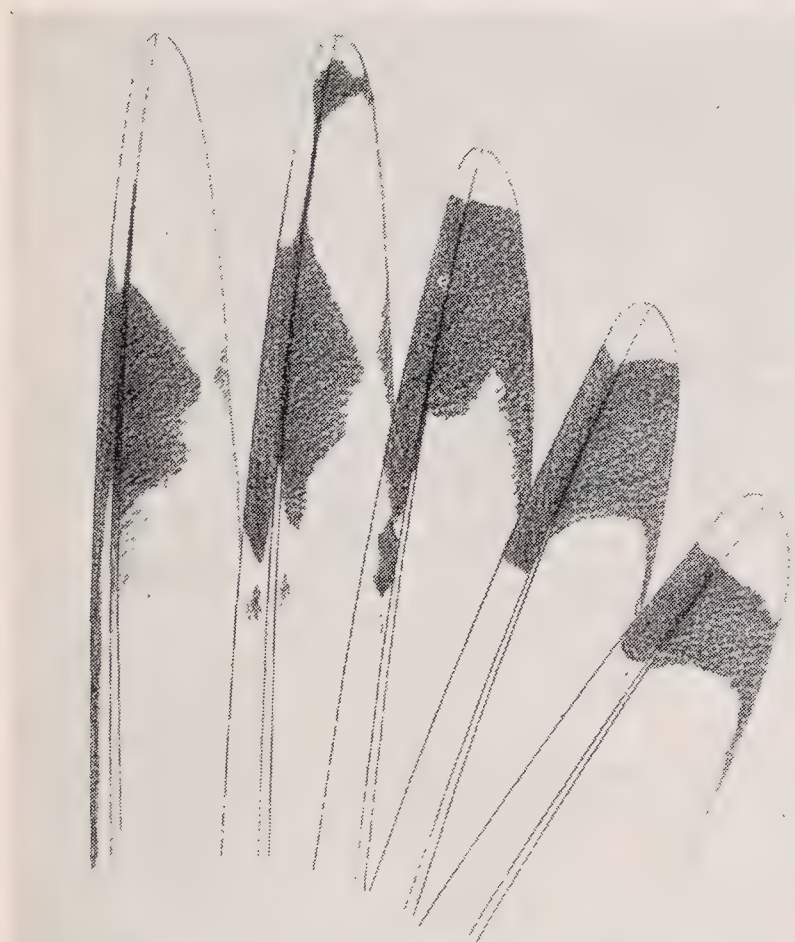
ADULT

FIG 226

Larus "kumlieni"

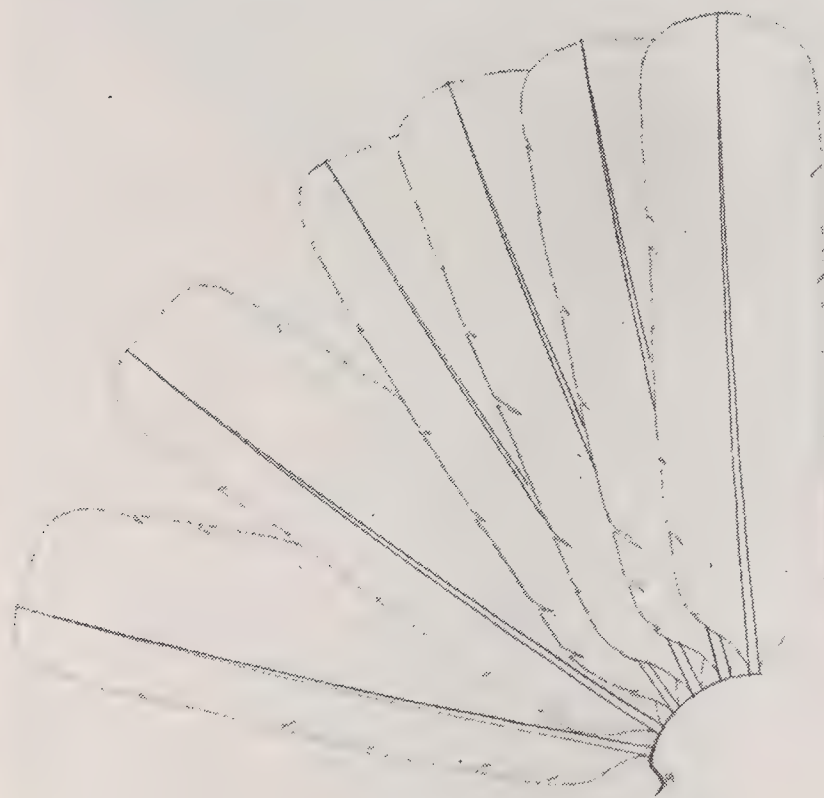


Larus ichthyaetus



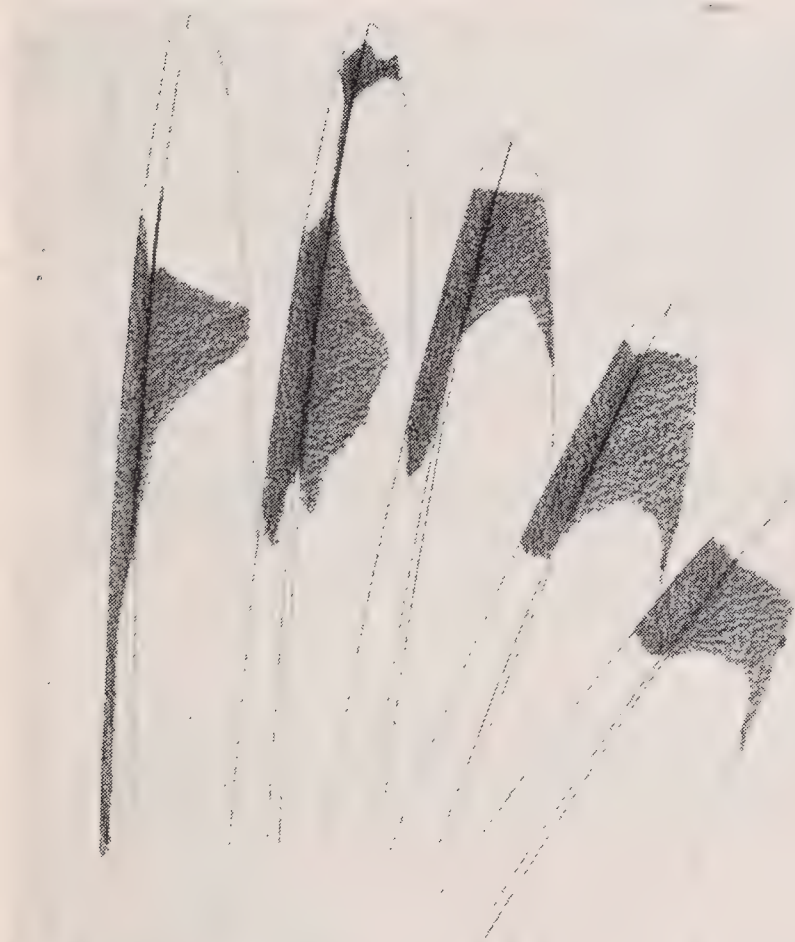
ADULT

FIG. 233



ADULT

FIG. 234



ADULT

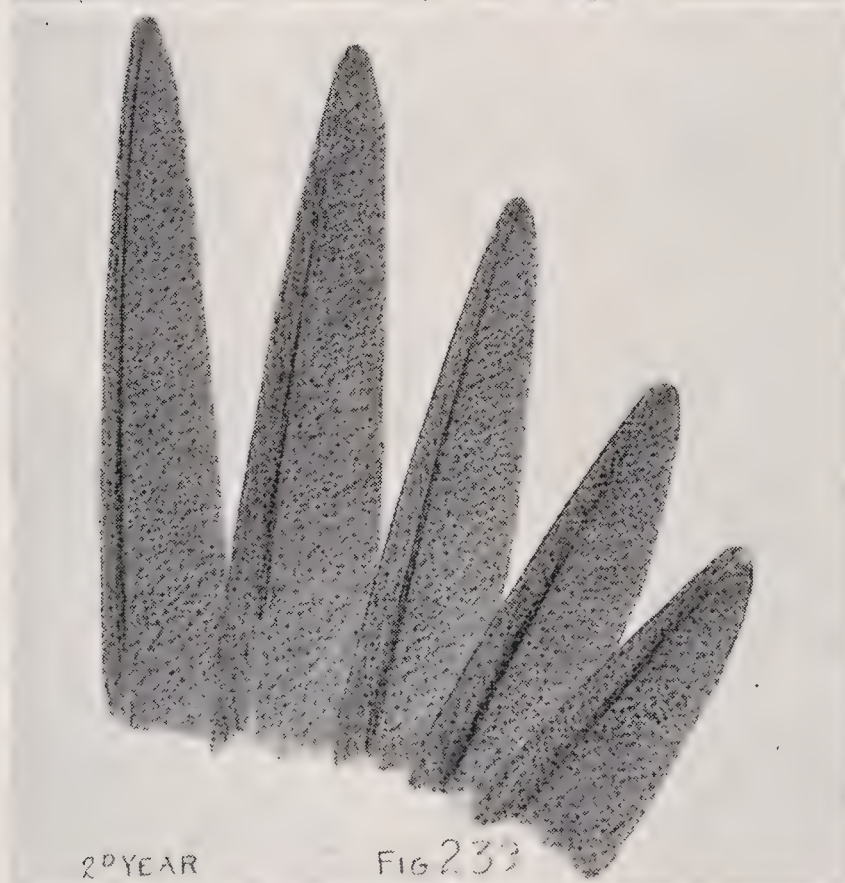
FIG. 235



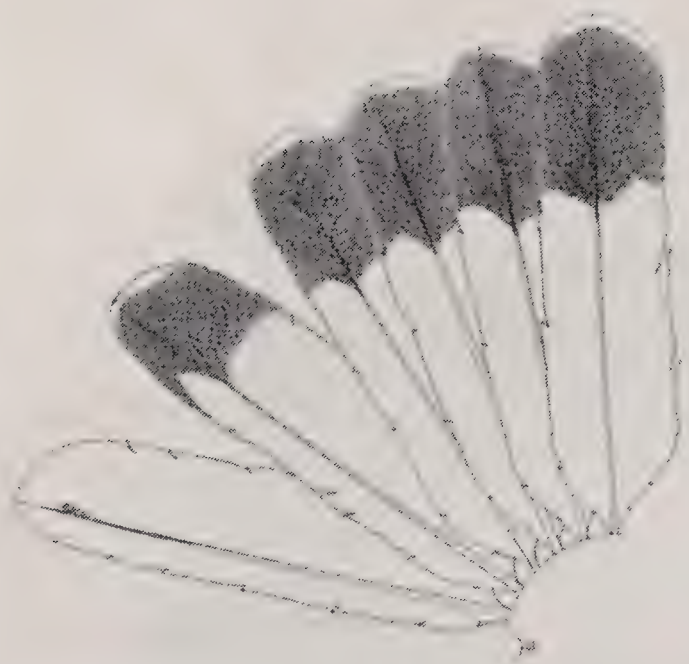
ADULT

FIG. 236

Larus ichthyaetus



Hydrocolæus atricilla



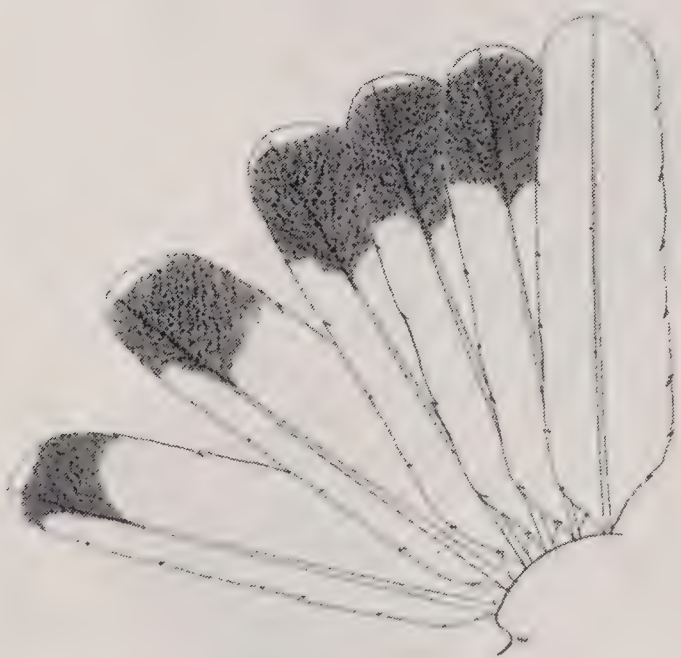
1st YEAR

FIG 243



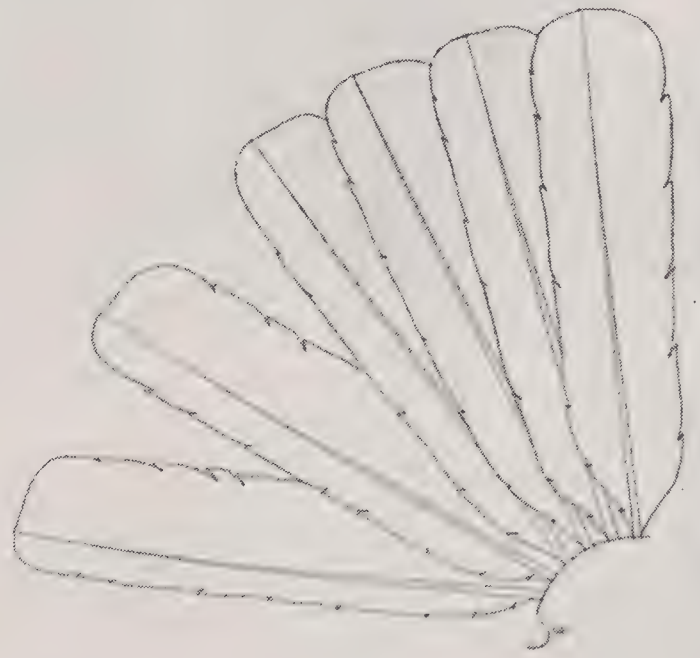
1st YEAR

FIG 244



1st YEAR

FIG 245



ADULT

FIG 246



ADULT

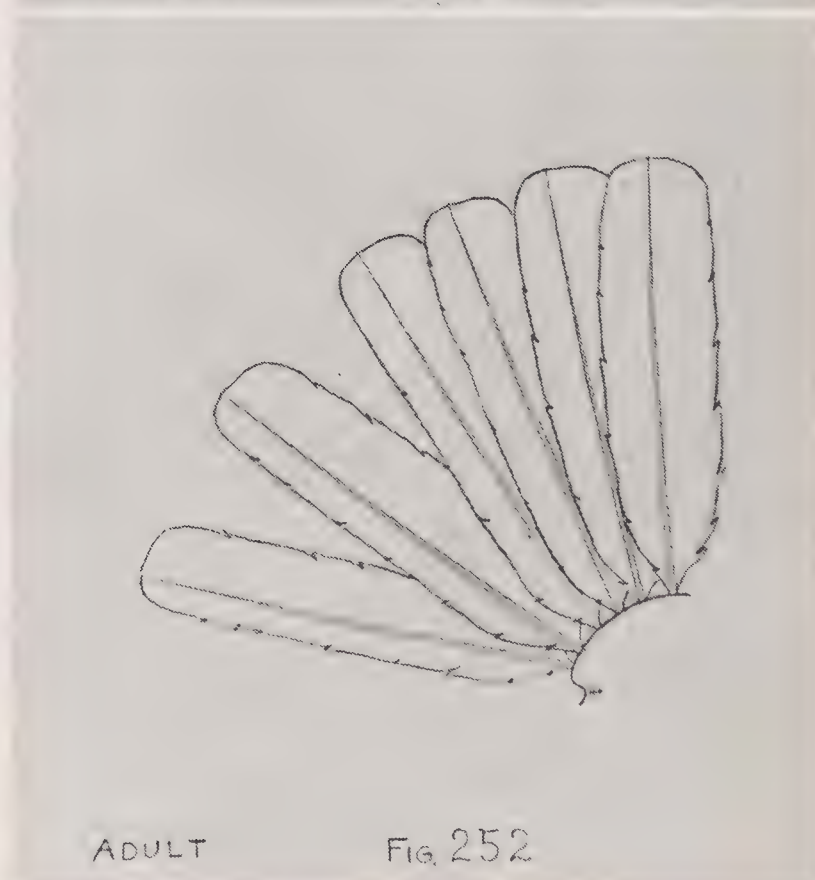
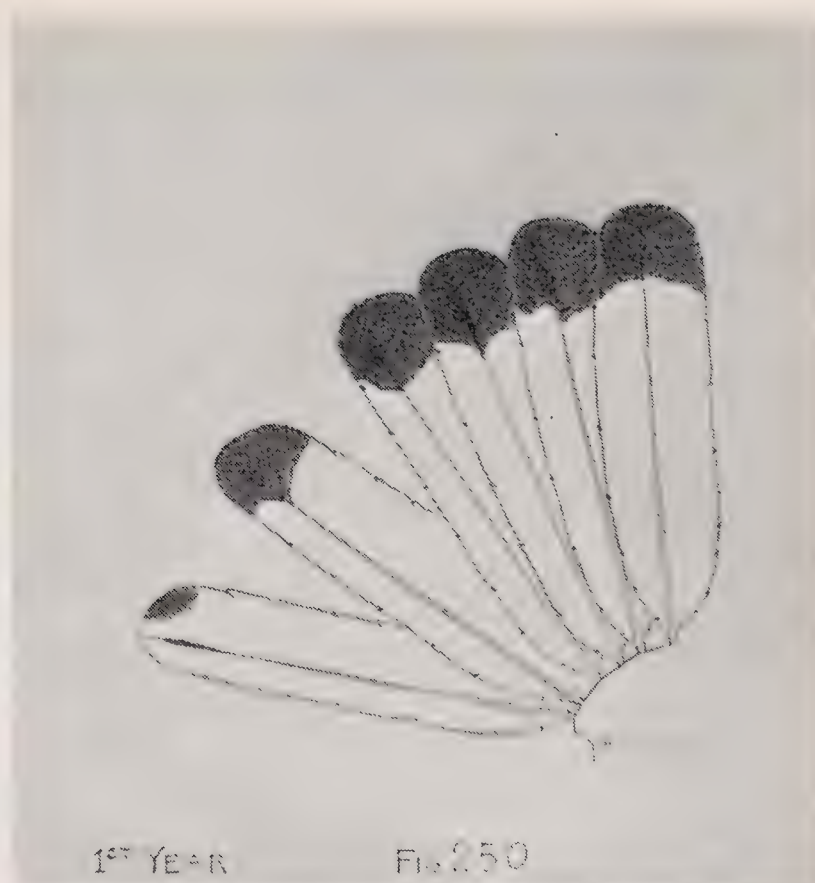
FIG 247



ADULT

FIG 248

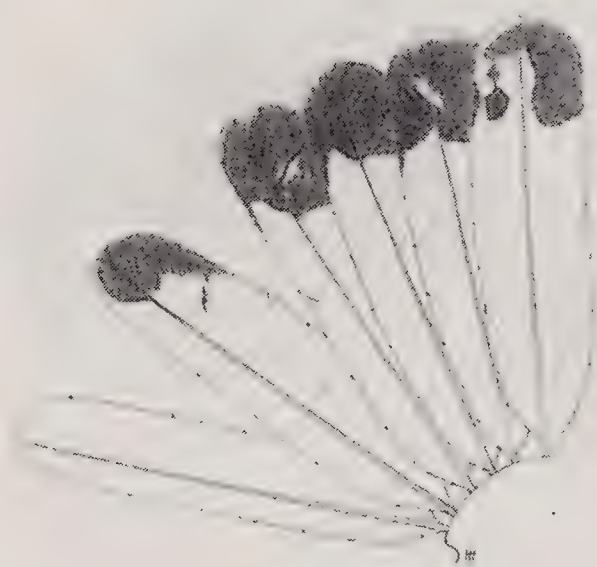
Hydrocolæus brunneicephalus



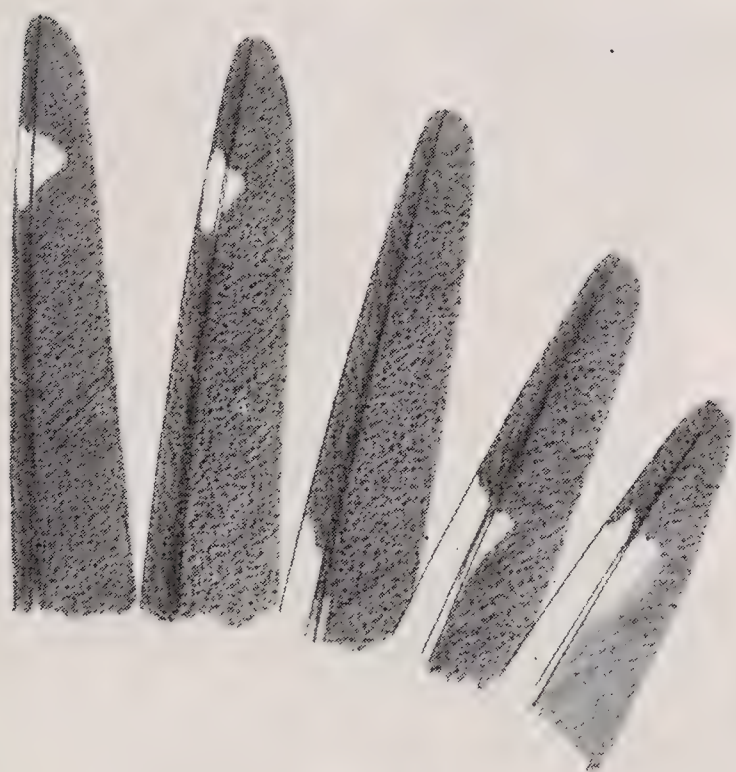
Hydrocolæus cirrhocephalus cirrhocephalus



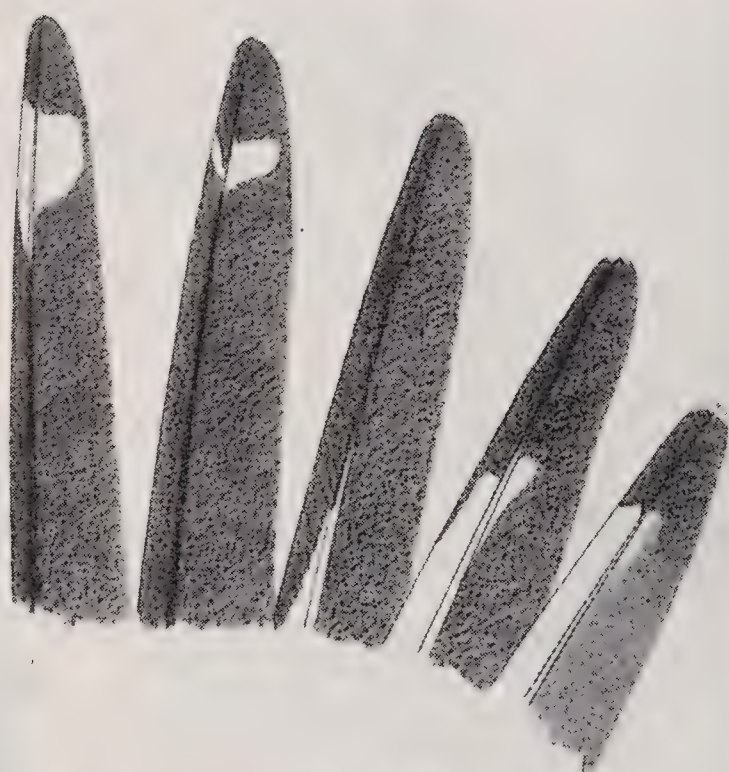
1st YEAR FIG. 255



1st YEAR FIG. 256



ADULT FIG. 257



ADULT FIG. 258

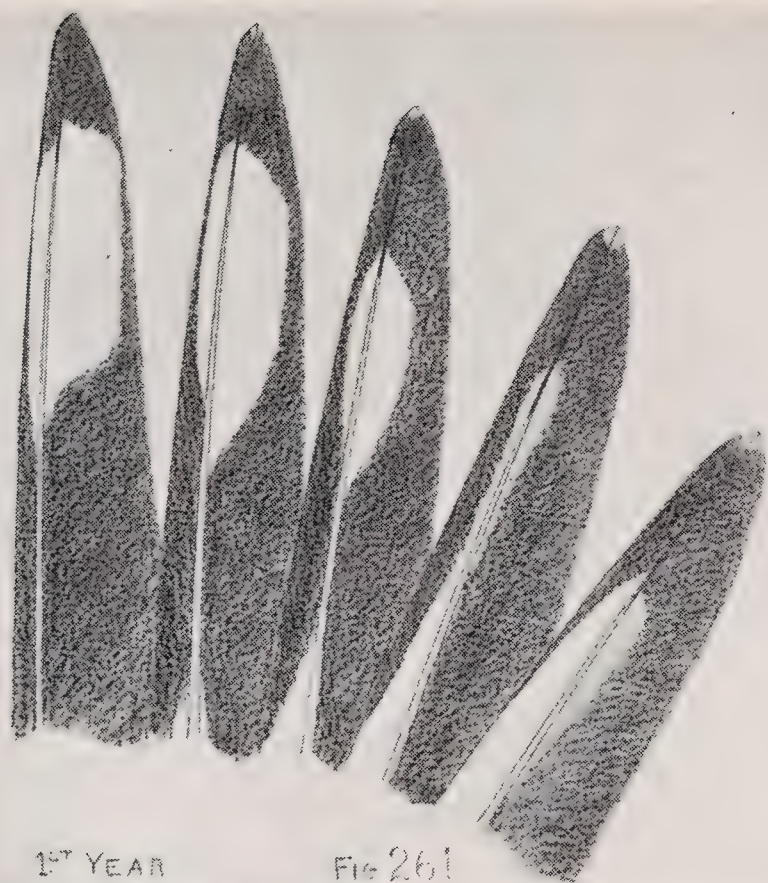


ADULT FIG. 259



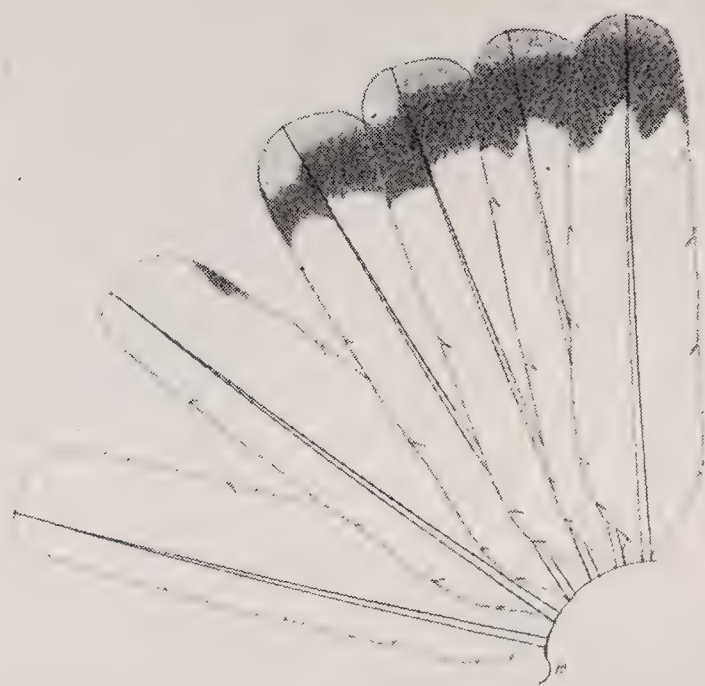
ADULT FIG. 260

Hydrocolæus cirrhocephalus phæocephalus



1ST YEAR

FIG. 261



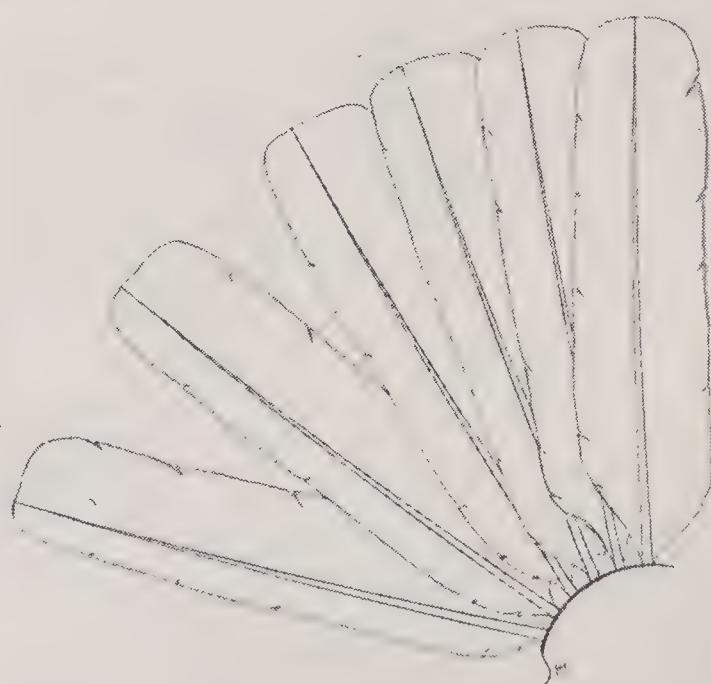
1ST YEAR

FIG. 262



ADULT

FIG. 263



ADULT

FIG. 264



ADULT

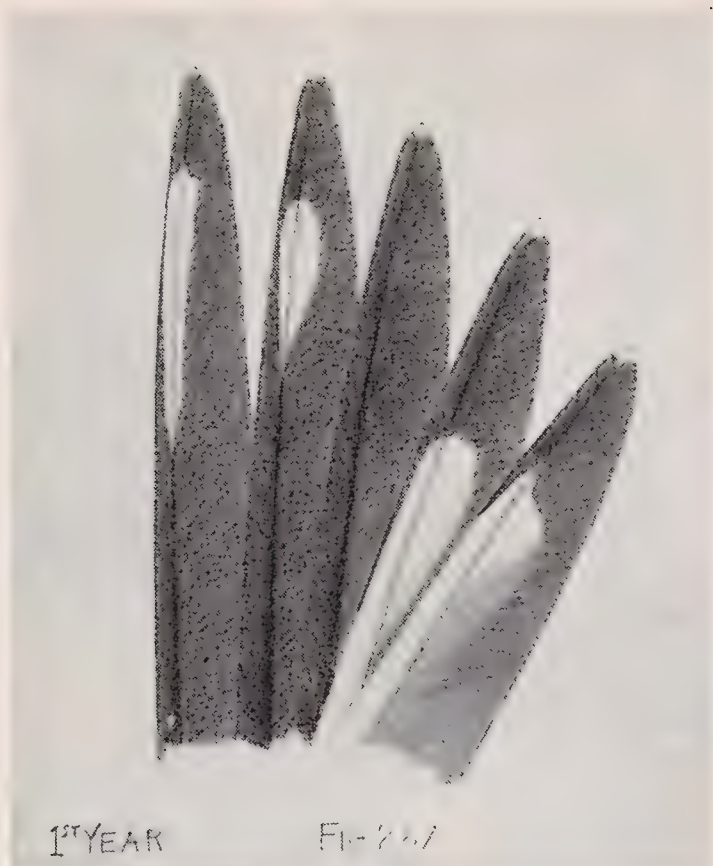
FIG. 265



ADULT

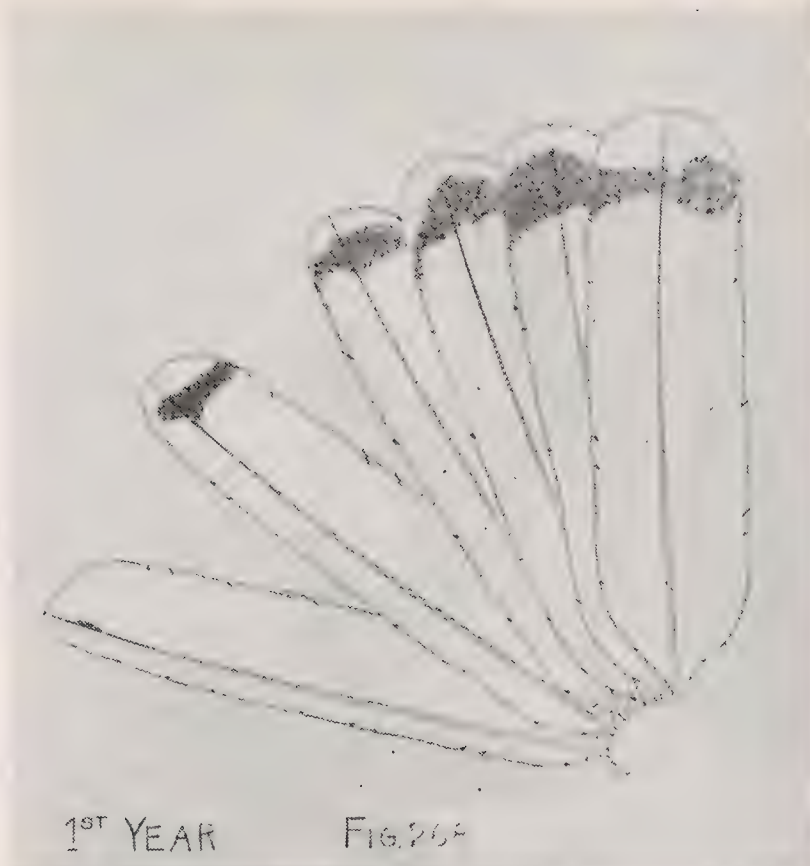
FIG. 266

Hydrocolæus serranus



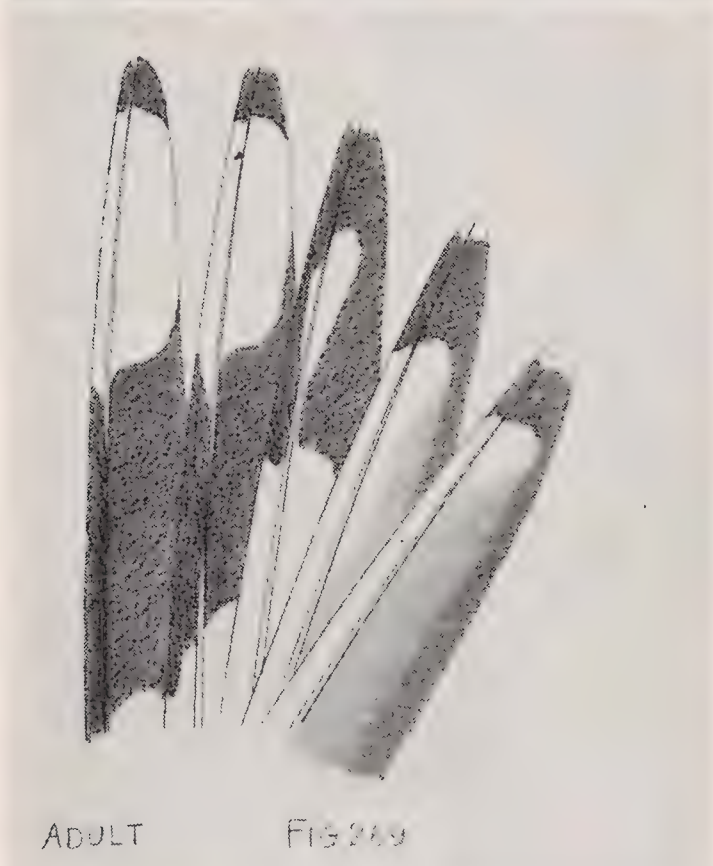
1ST YEAR

FIG. 267



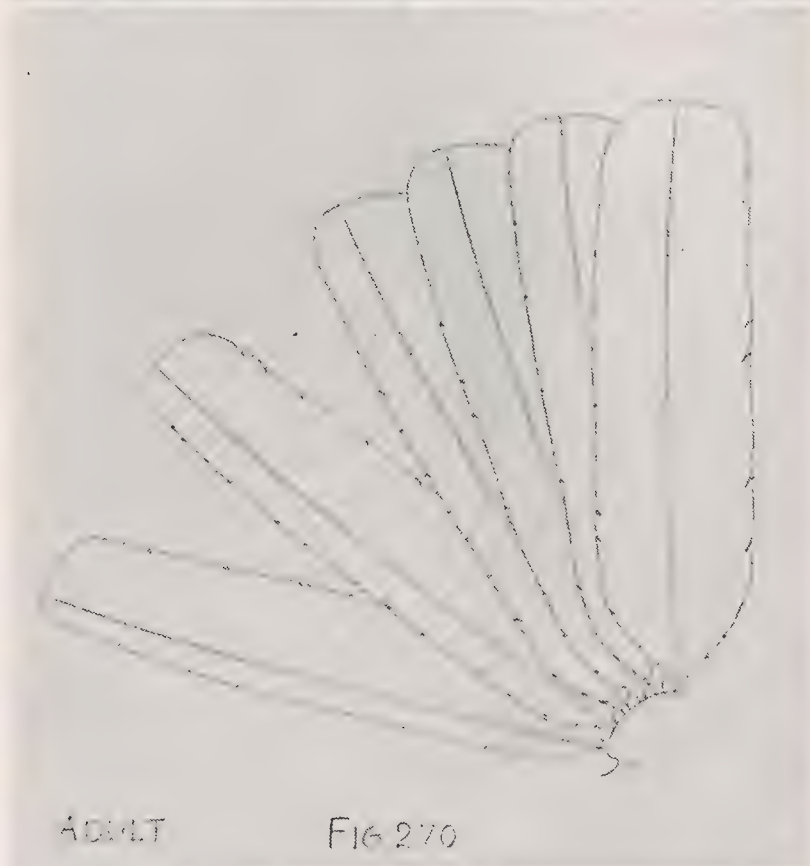
1ST YEAR

FIG. 268



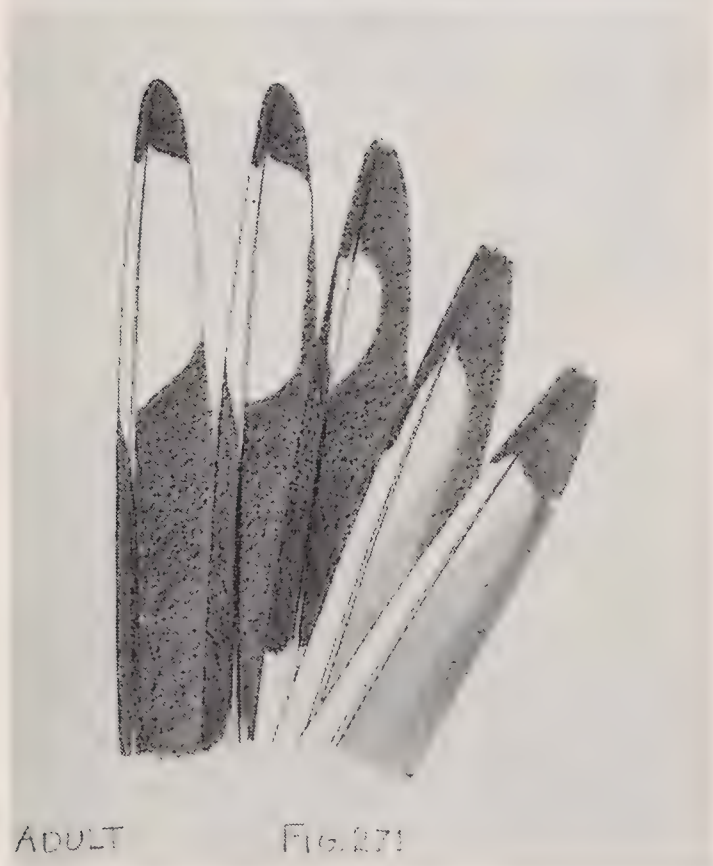
ADULT

FIG. 269



ADULT

FIG. 270



ADULT

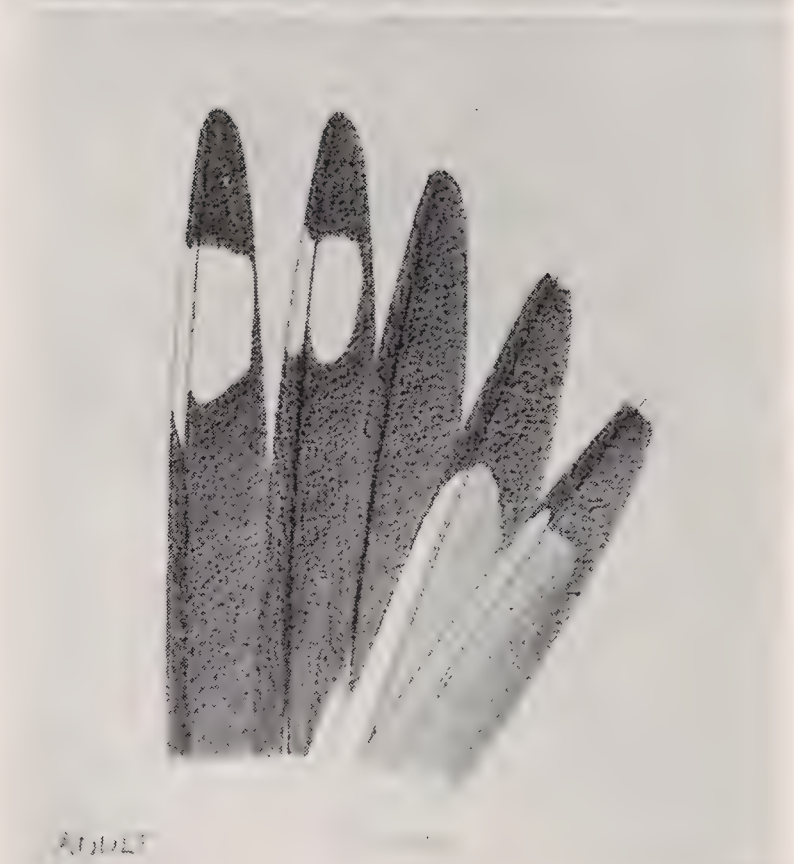
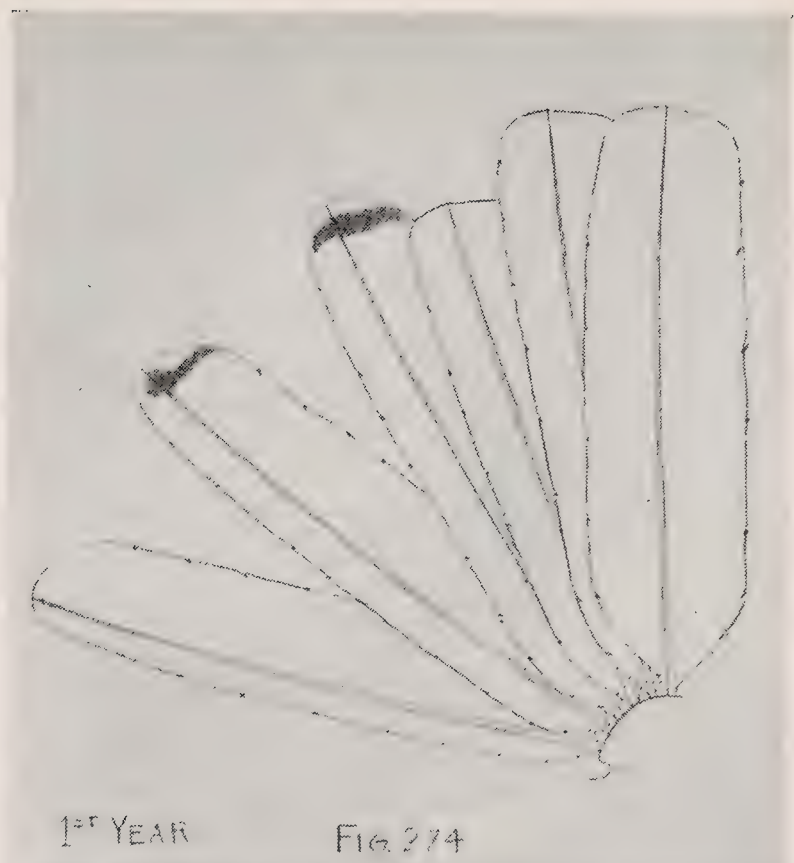
FIG. 271



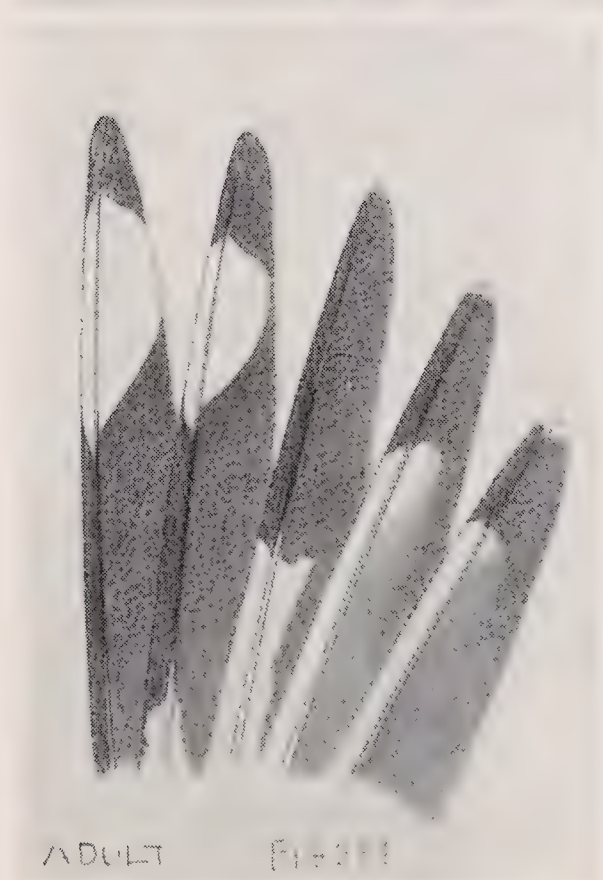
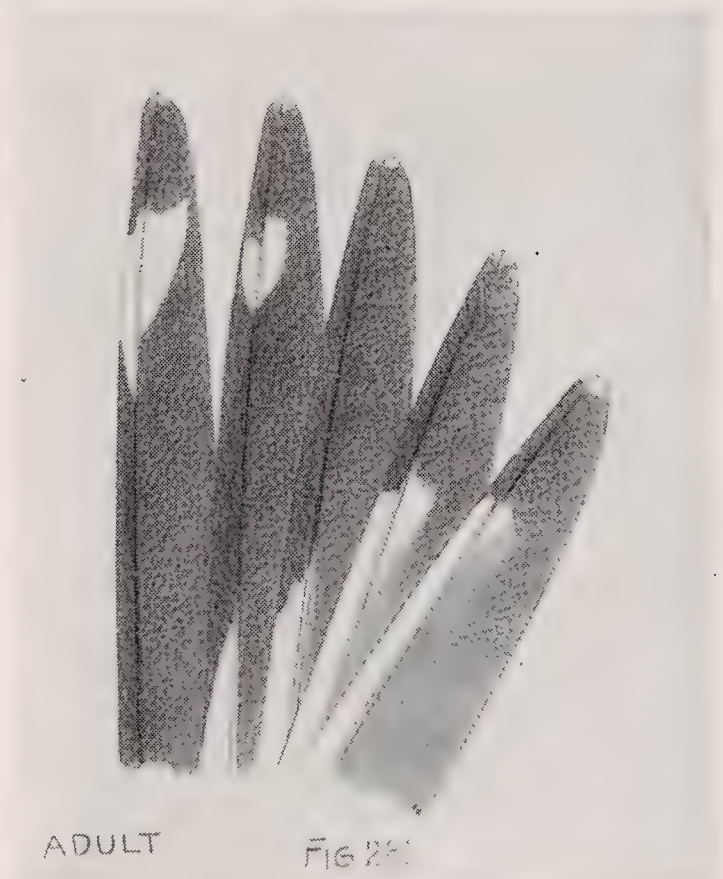
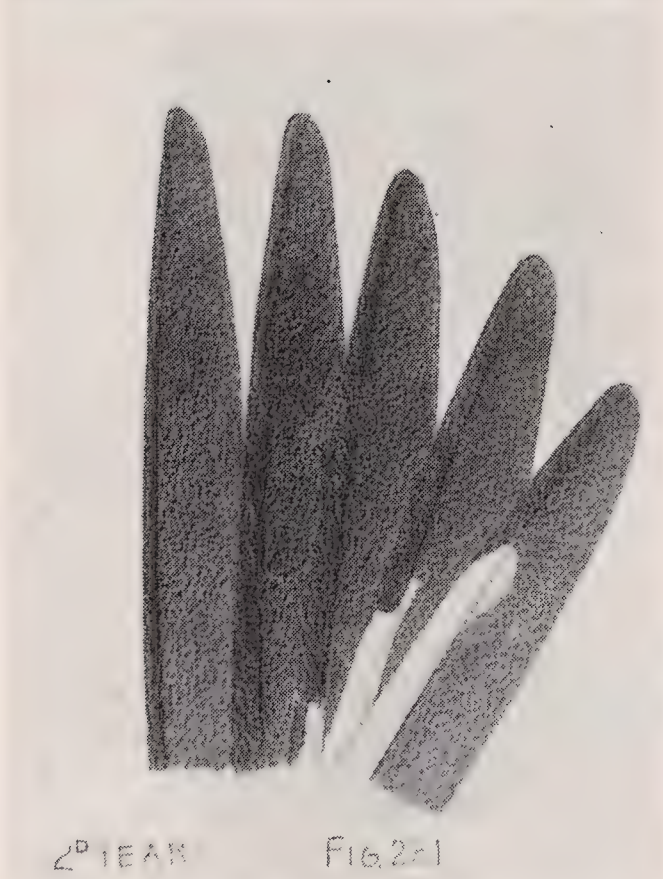
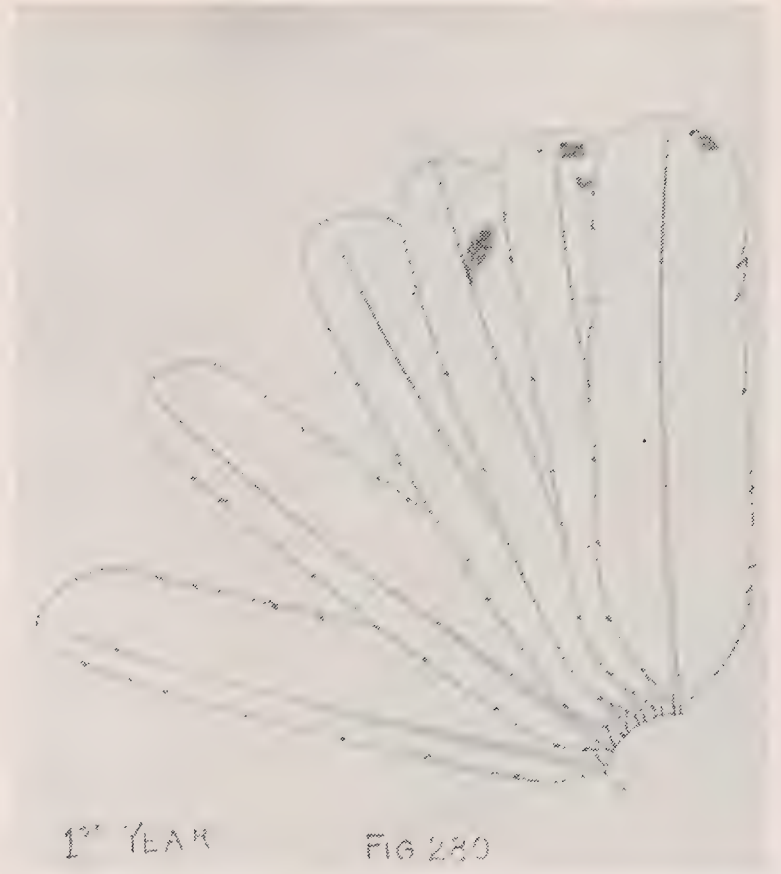
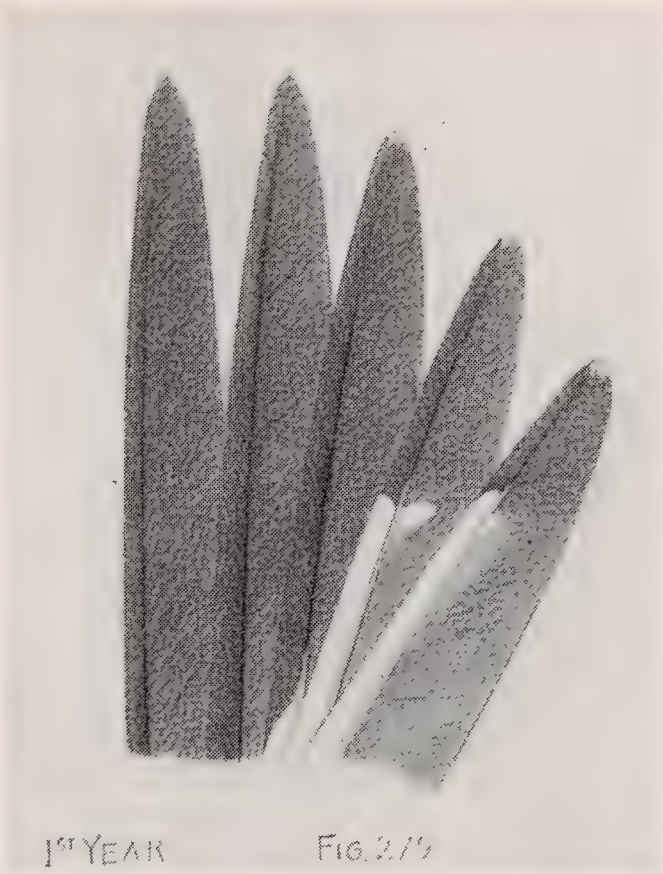
ADULT

FIG. 272

Hydrocolæus novæ-hollandiæ novæ-hollandiæ (Figs. 267 to 271)
Hydrocolæus novæ-hollandiæ gunni (Fig. 272)



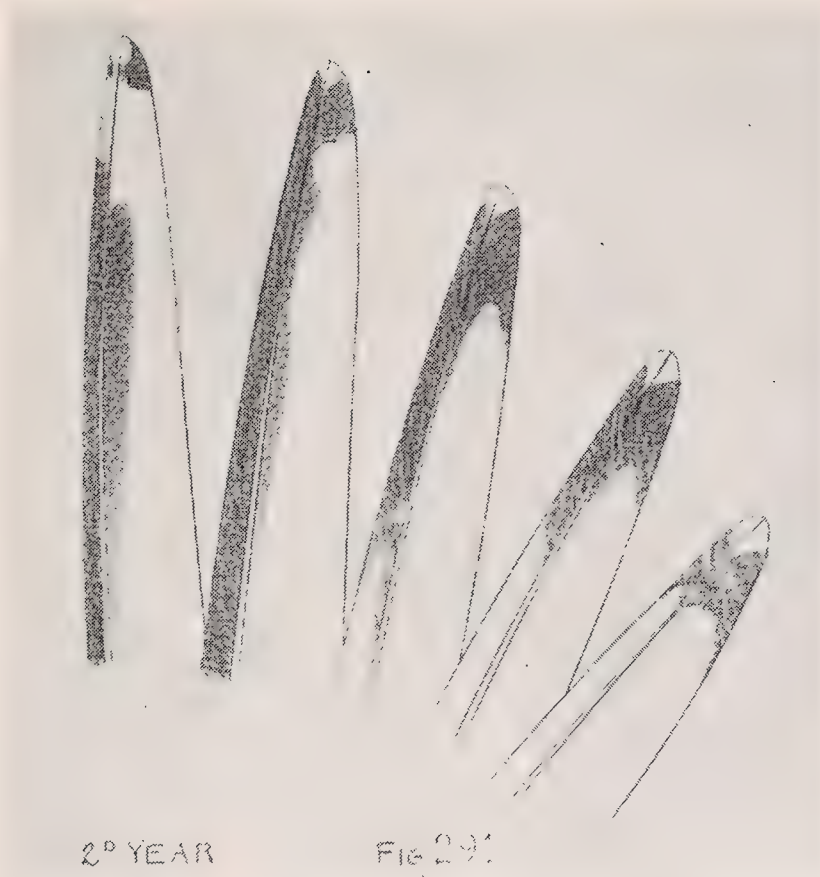
Hydrocolæus novæ-hollandiæ scopulinus (Figs. 275, 277, 278)
Hydrocolæus novæ-hollandiæ gouldi (Figs. 273, 274, 276)



Hydrocolæus novæ-hollandiæ hartlaubi



Hydrocolæus melanocephalus



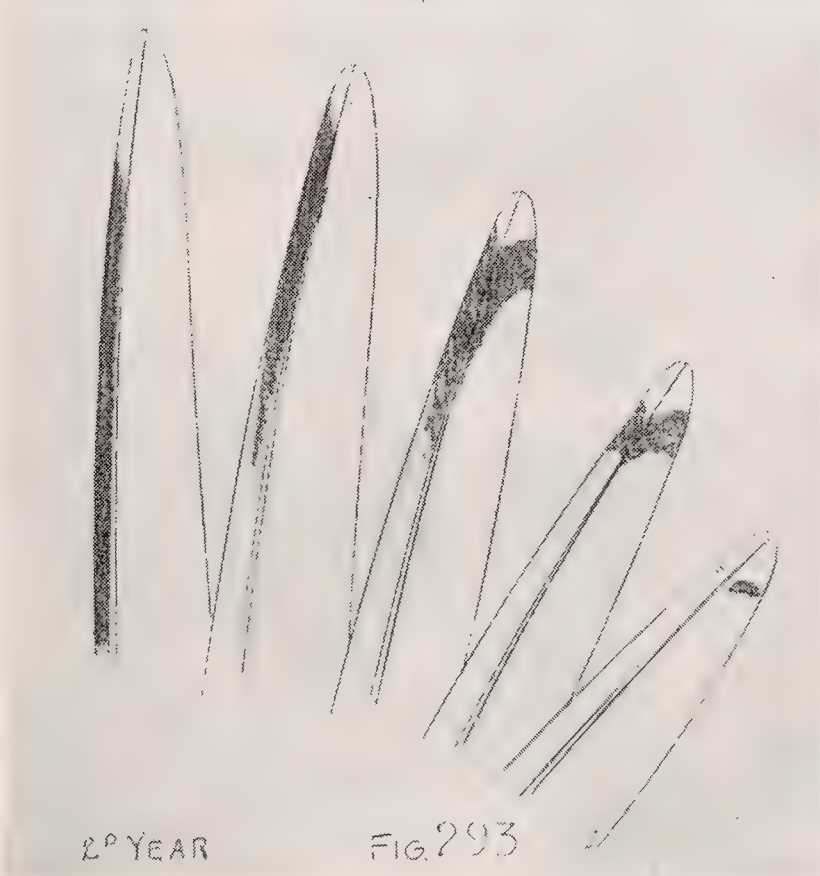
2^D YEAR

FIG. 291



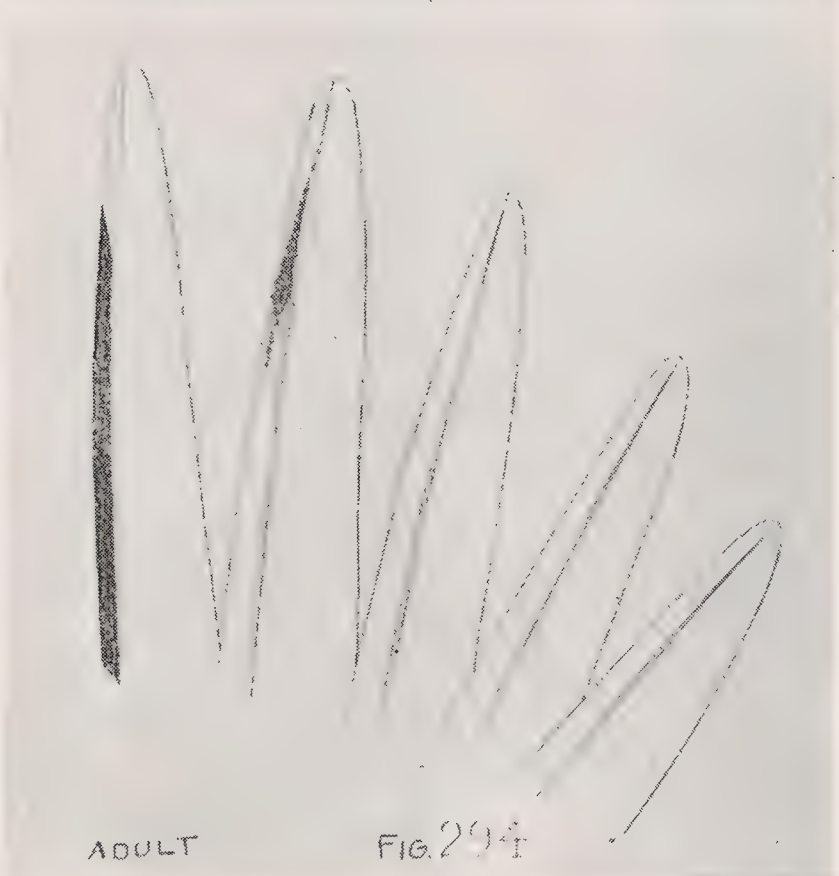
2^D YEAR

FIG. 292



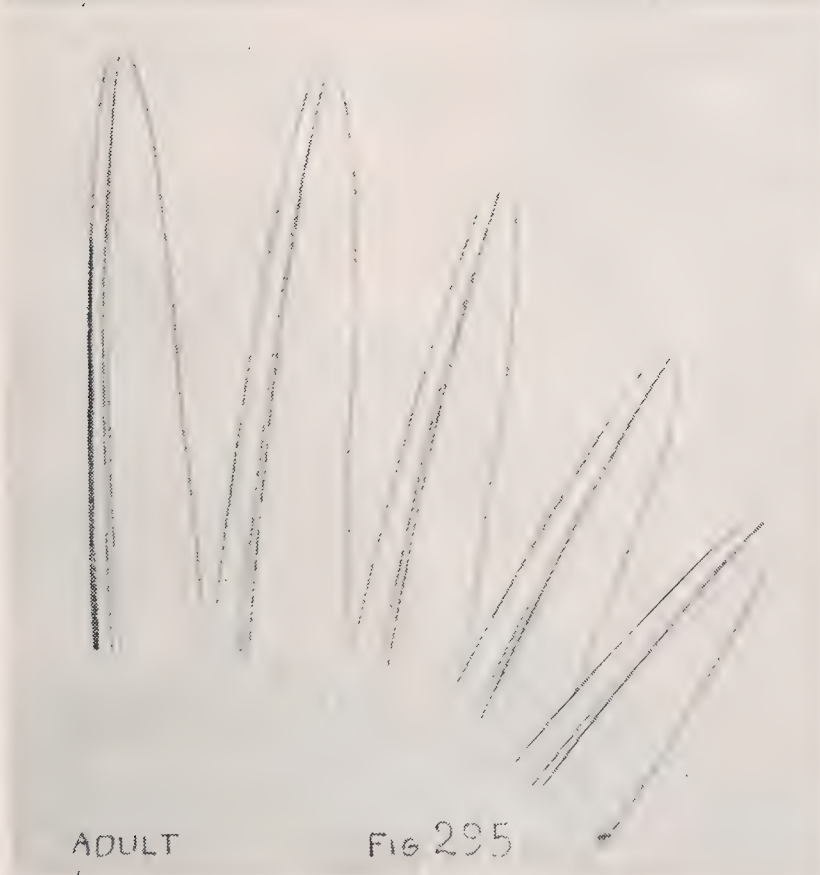
2^D YEAR

FIG. 293



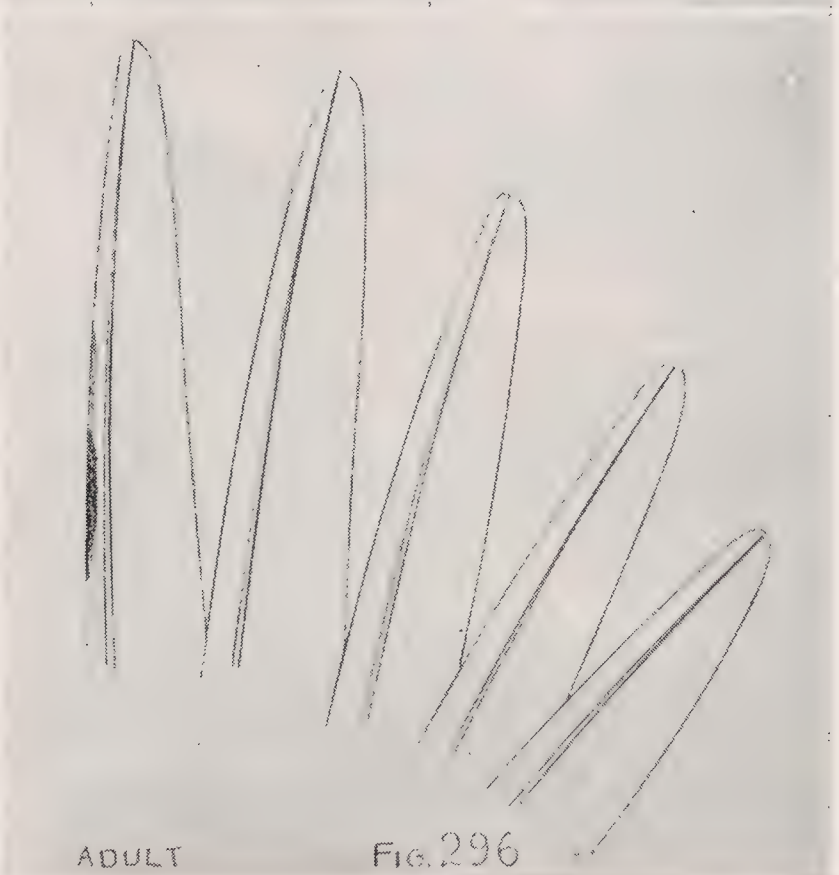
ADULT

FIG. 294



ADULT

FIG. 295



ADULT

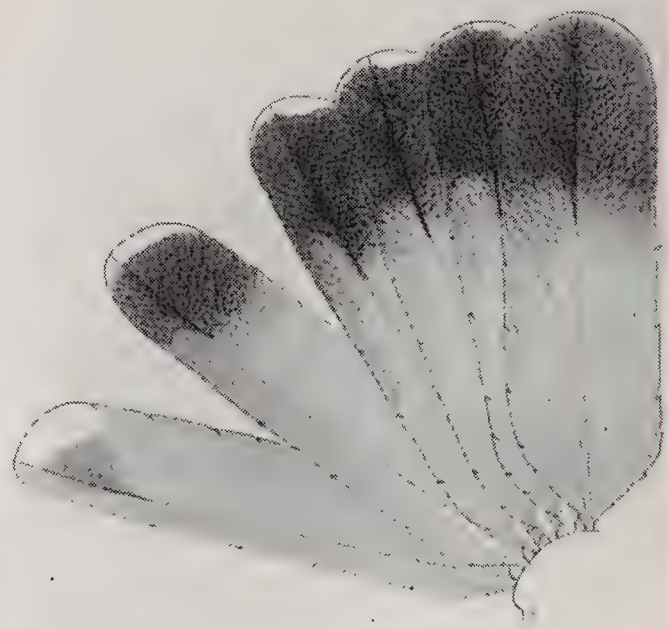
FIG. 296

Hydrocolæus melanocephalus



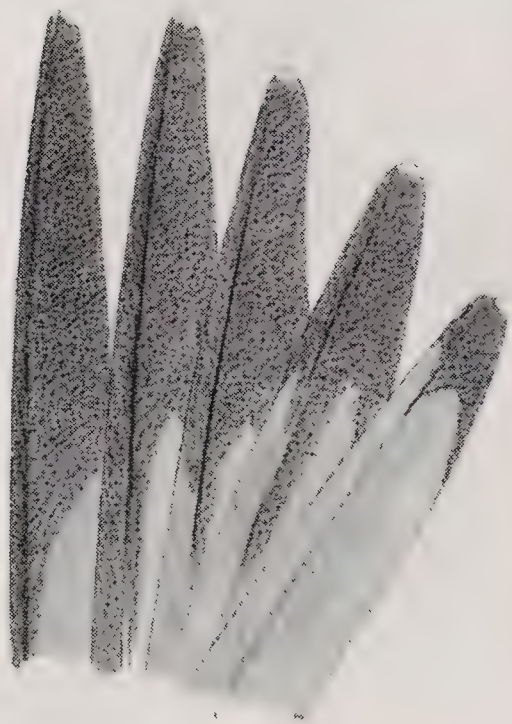
1st WINTER

FIG. 287



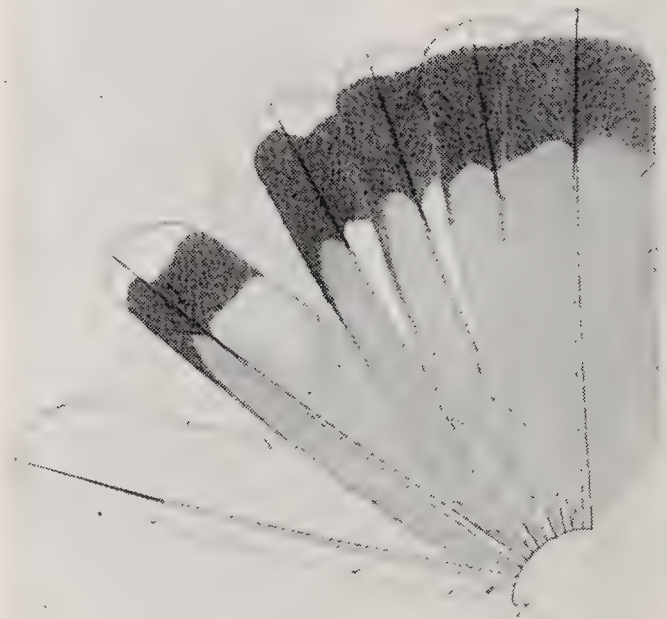
1st WINTER

FIG. 288



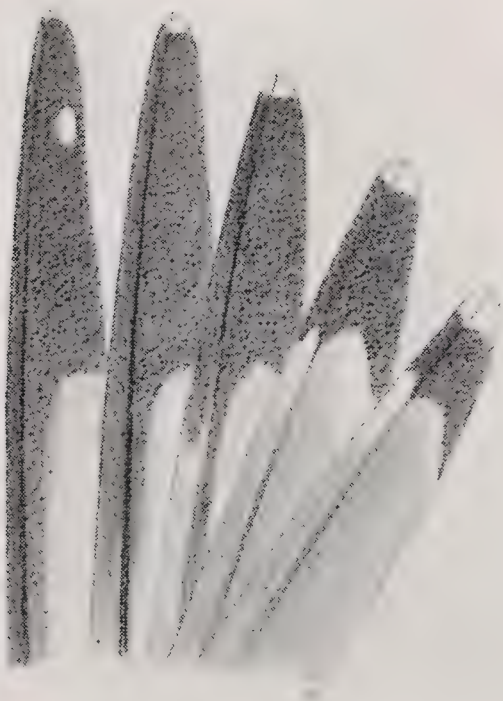
1st WINTER

FIG. 289

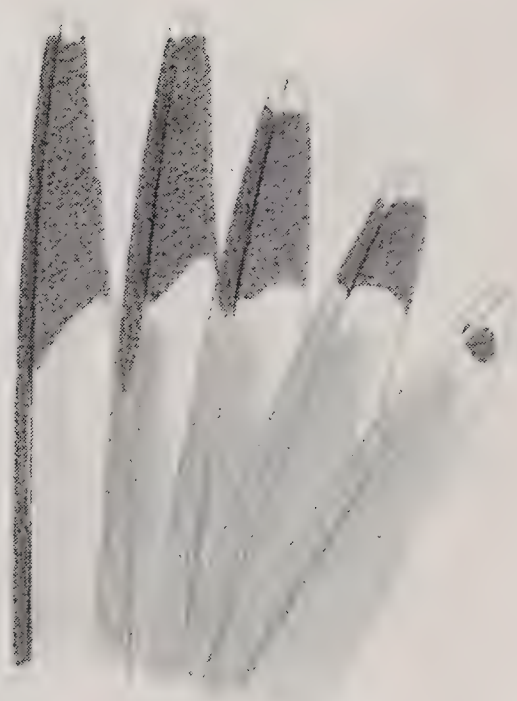


1st WINTER

FIG. 290



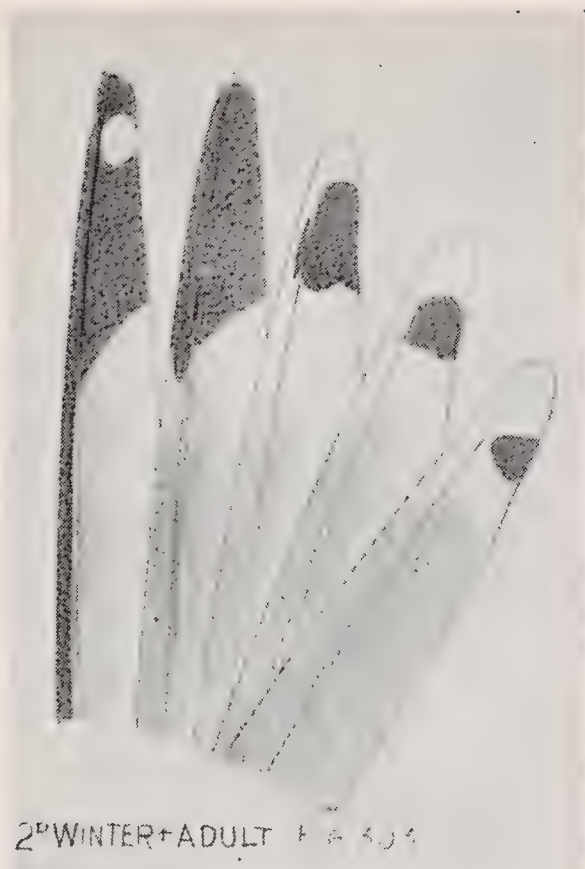
2nd WINTER



2nd WINTER

FIG. 292

Hydrocolæus pipixcan

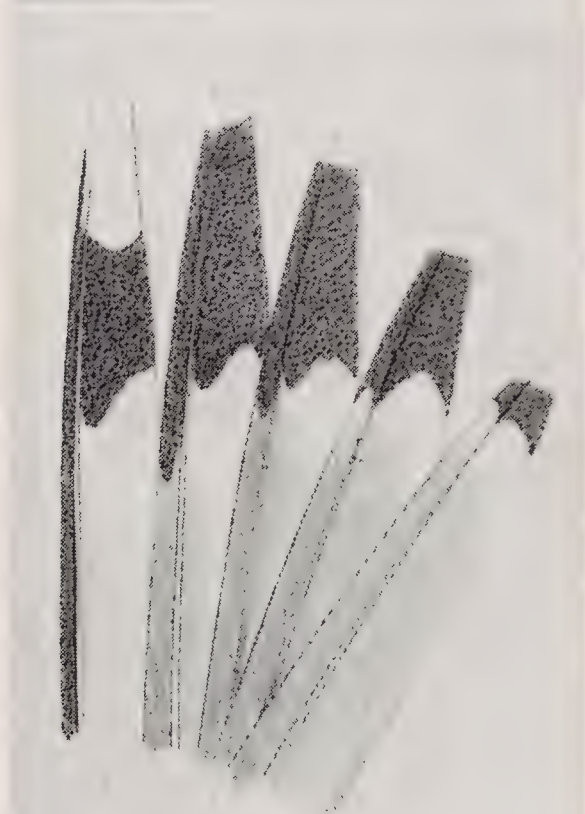


2nd WINTER+ADULT Fig. 304



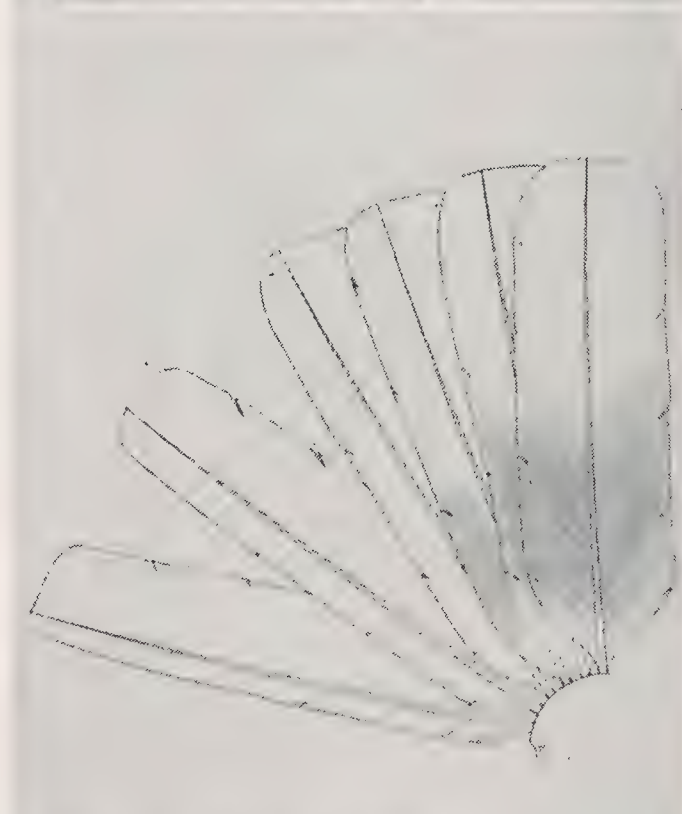
ADULT

Fig. 305



ADULT

Fig. 306



2nd WINTER, ADULT Fig. 307



ADULT

Fig. 308



ADULT

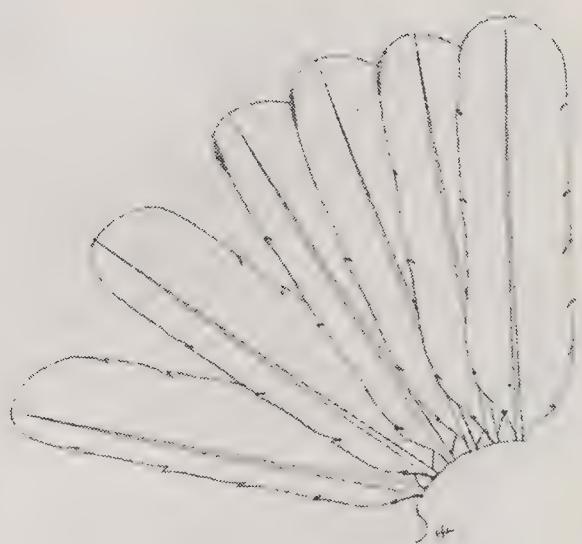
Fig. 309

Hydrocolæus pipixcan



1ST YEAR

FIG. 309



1ST YEAR

FIG. 310



ADULT

FIG. 311



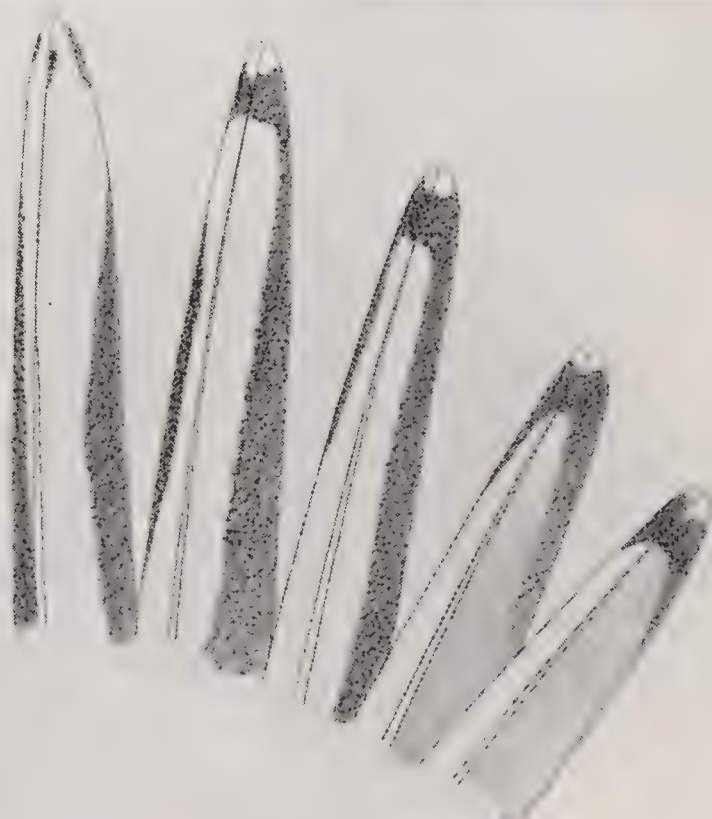
ADULT

FIG. 312



ADULT

FIG. 313



ADULT

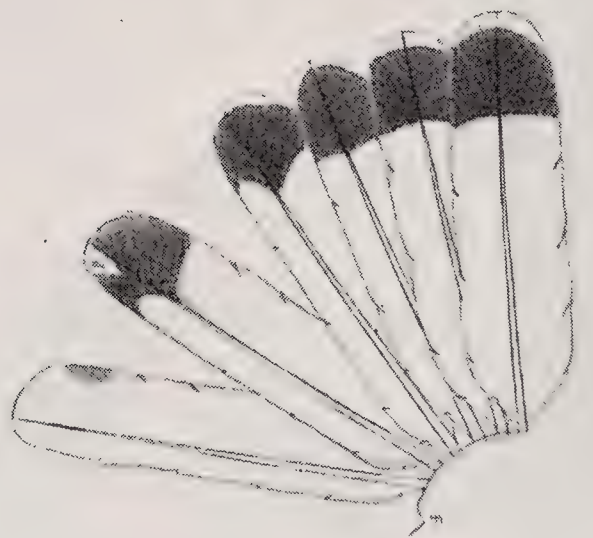
FIG. 314

Hydrocolæus bulleri



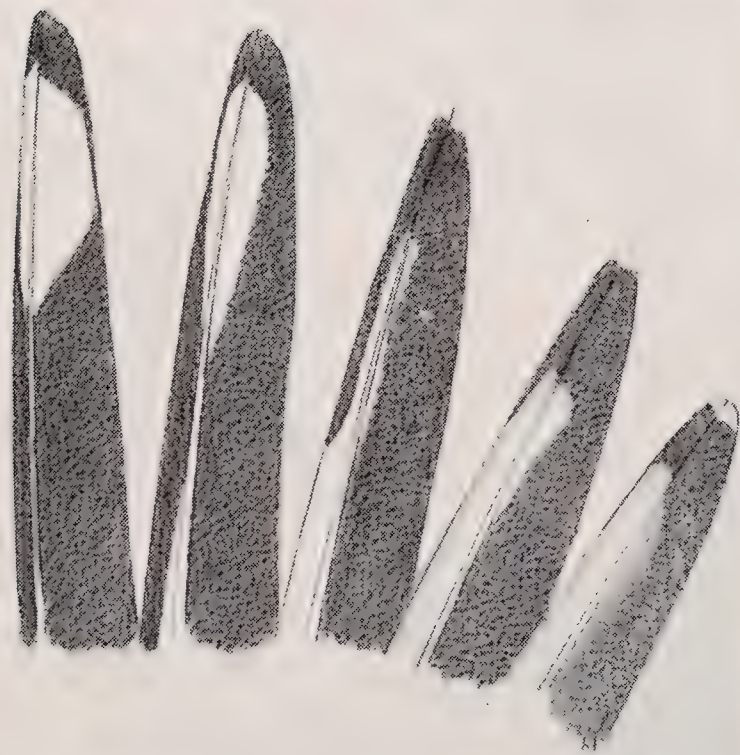
1st YEAR

FIG. 315



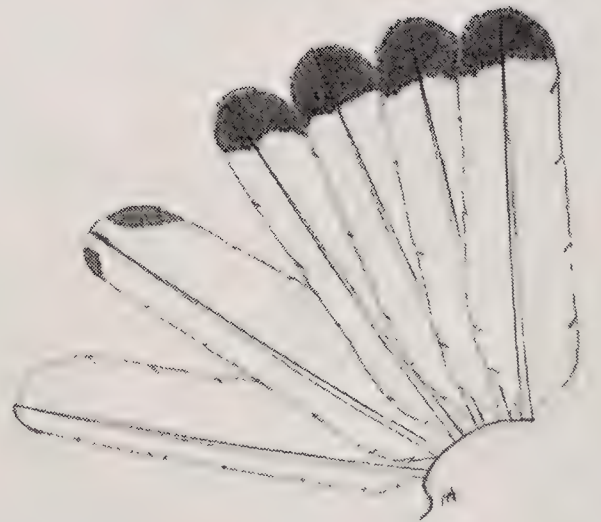
1st YEAR

FIG. 316



1st YEAR

FIG. 317



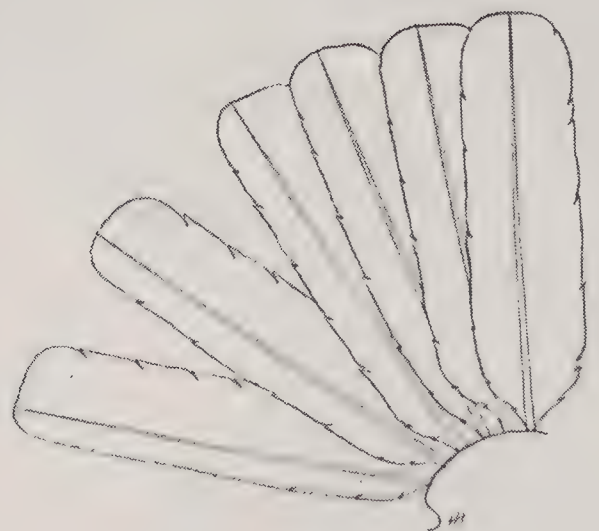
1st YEAR

FIG. 318



2^d YEAR

FIG. 319



ADULT

FIG. 320

Hydrocolæus maculipennis



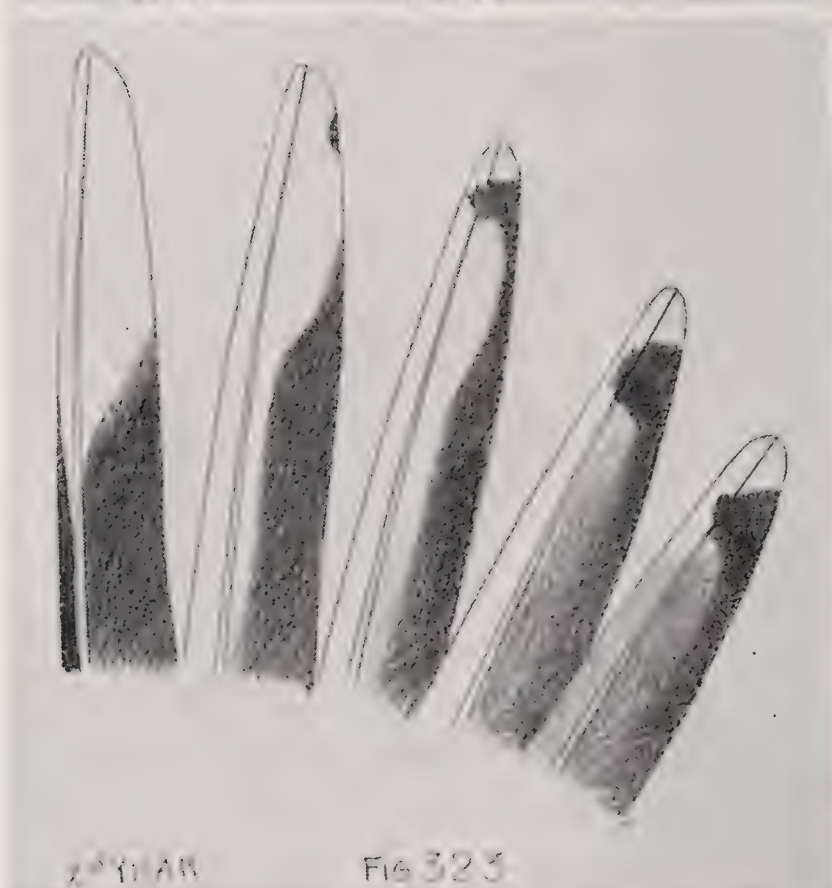
1st YEAR

FIG 321



1st YEAR

FIG 322



2nd YEAR

FIG 323



2nd YEAR

FIG 324



2nd YEAR

FIG 325



ADULT

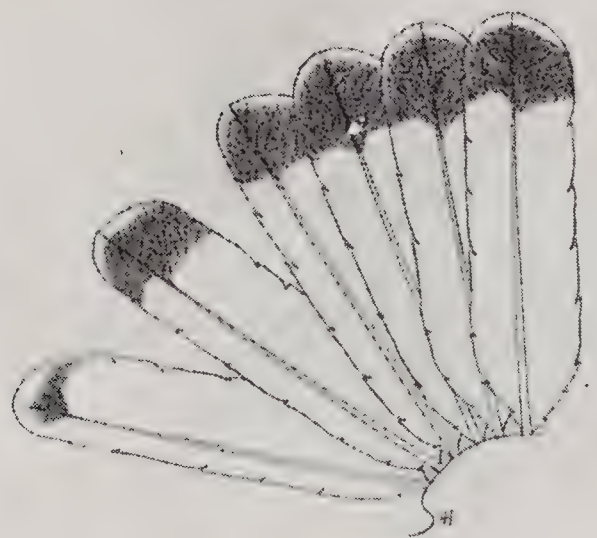
FIG 326

Hydrocolæus maculipennis



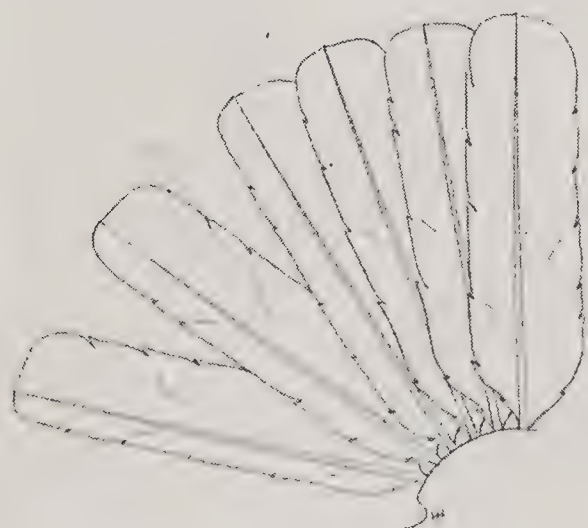
1ST YEAR

FIG. 327



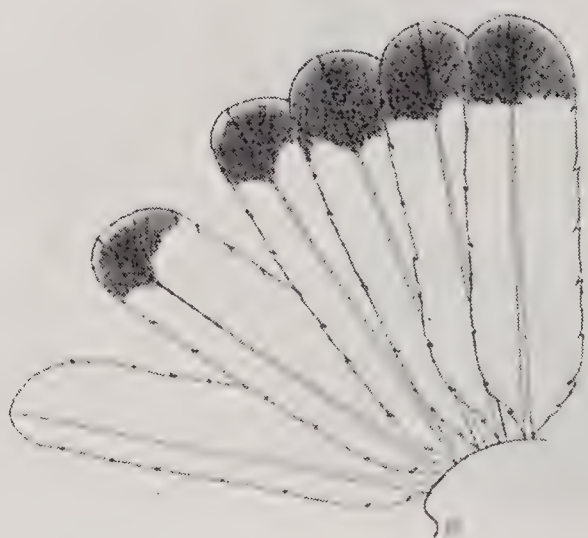
1ST YEAR

FIG. 328



ADULT

FIG. 329



1ST YEAR

FIG. 330



ADULT

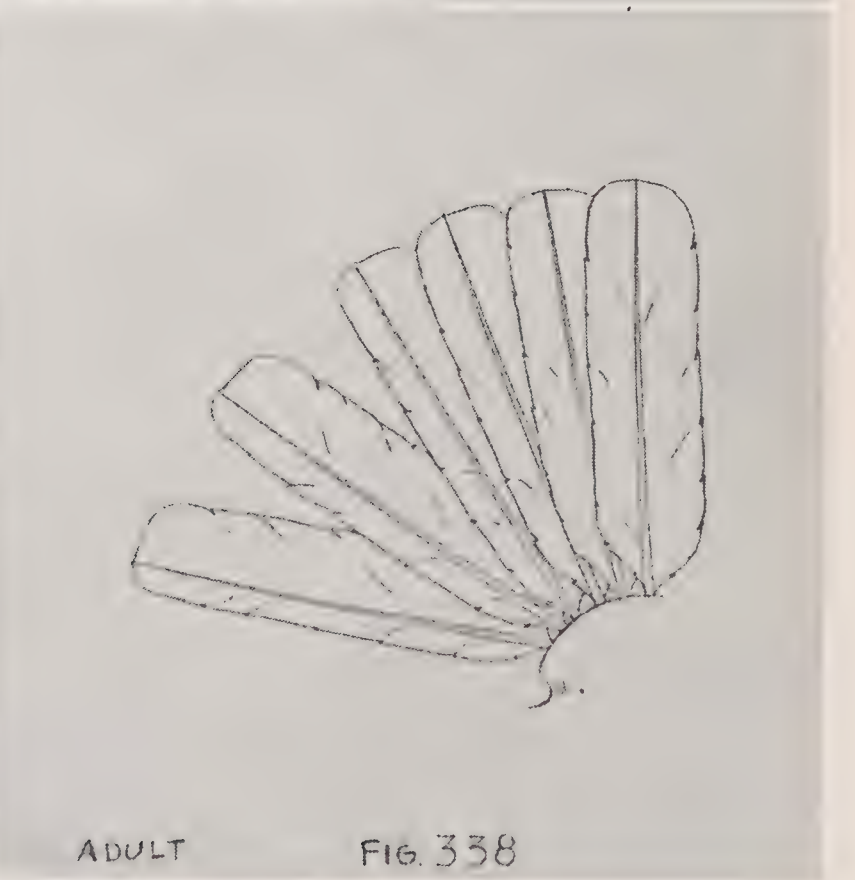
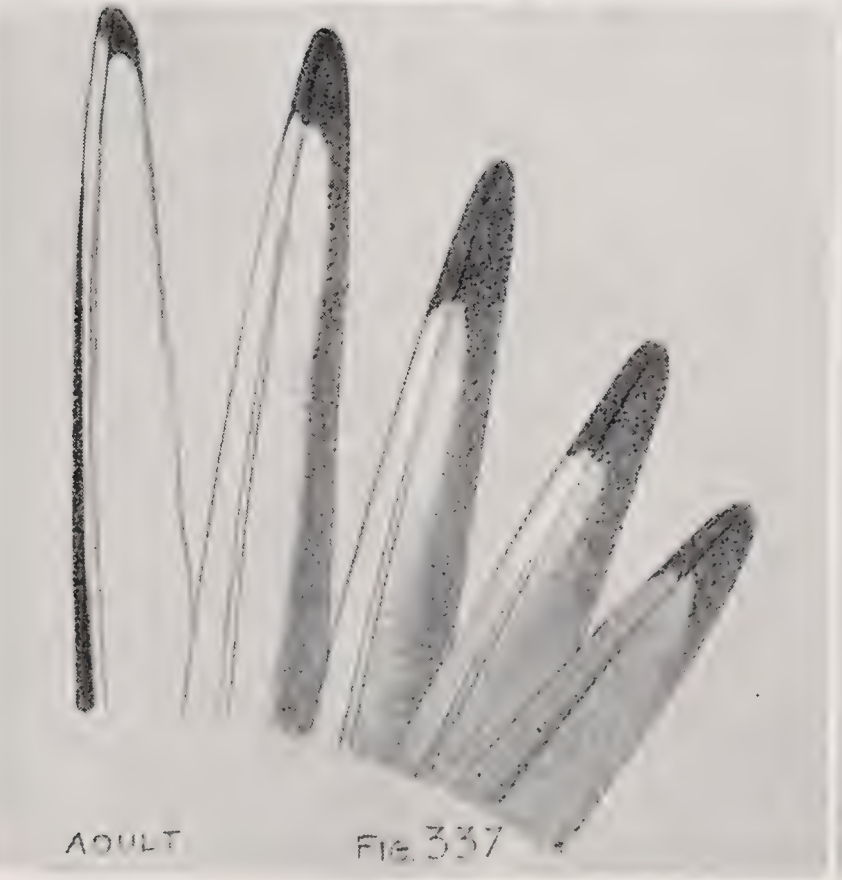
FIG. 331



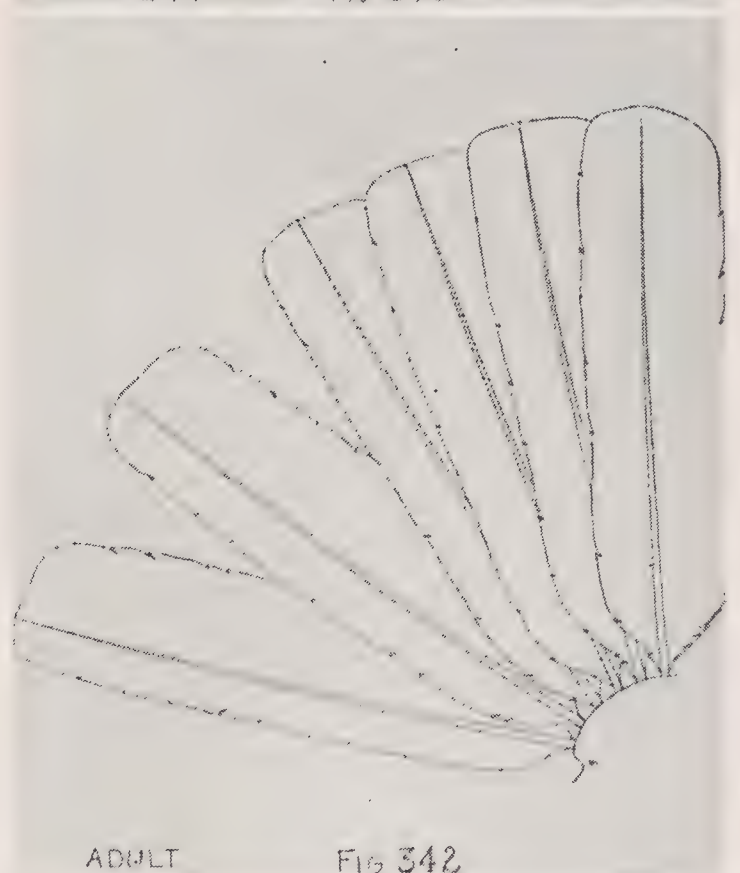
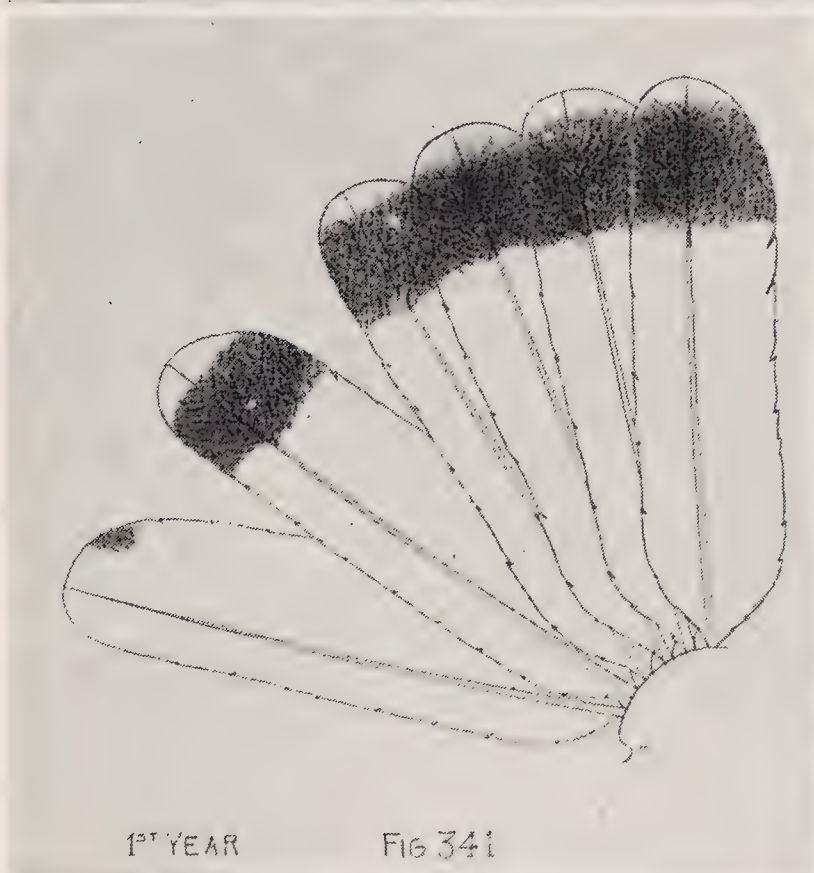
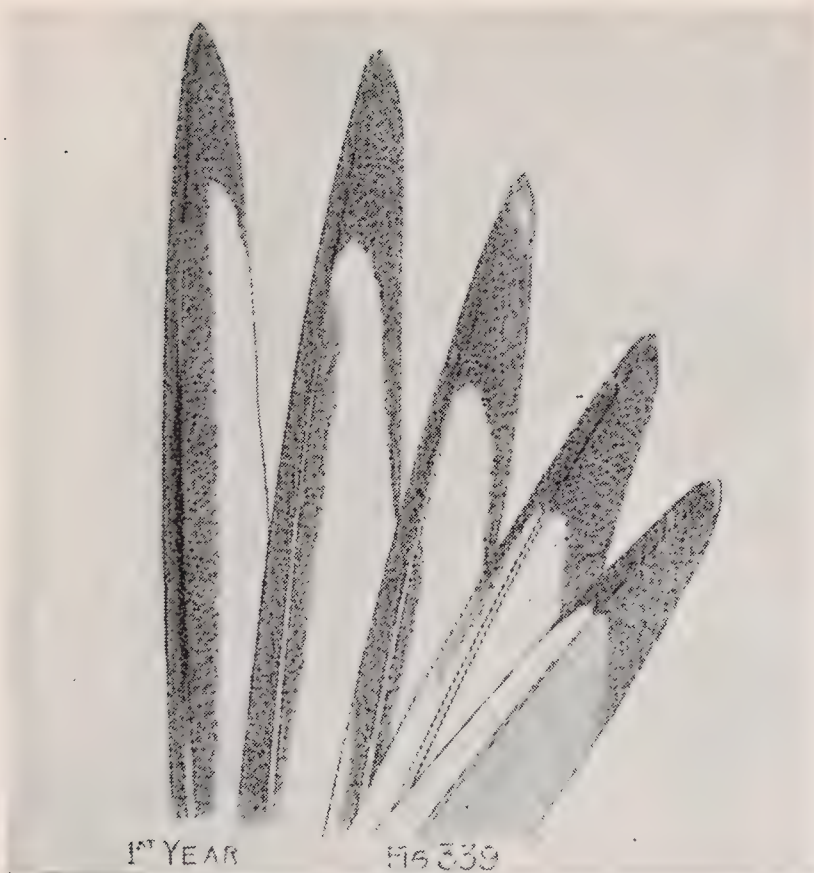
ADULT

FIG. 332

Hydrocolæus ridibundus ridibundus (Figs. 327, 329, 330, 332)
Hydrocolæus ridibundus sibiricus (Figs. 328, 331)



Hydrocolæus genëi

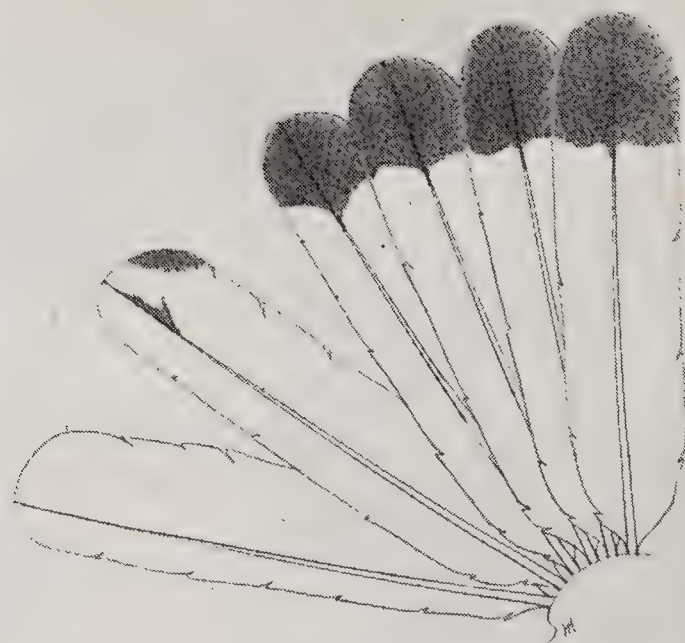


Hydrocolæus philadelphia



1ST YEAR

FIG. 345



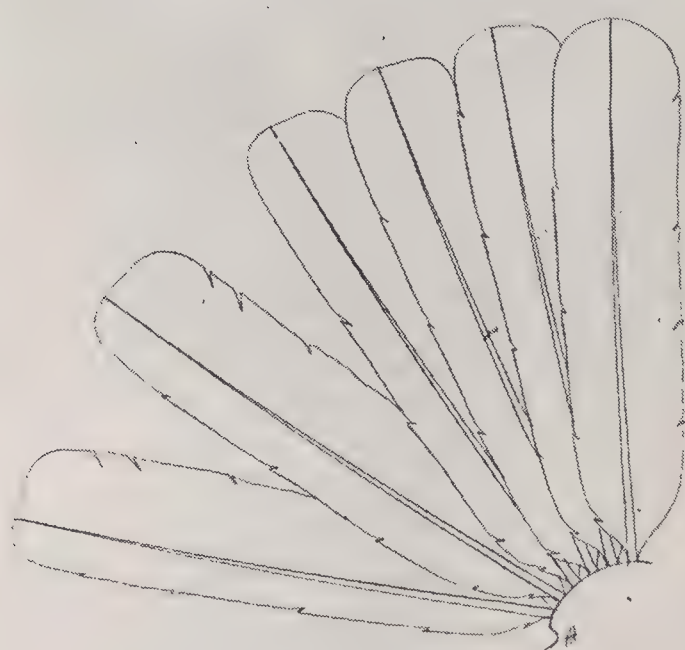
1ST YEAR

FIG. 346



2ND YEAR

FIG. 347



ADULT

FIG. 348



ADULT

FIG. 349



ADULT

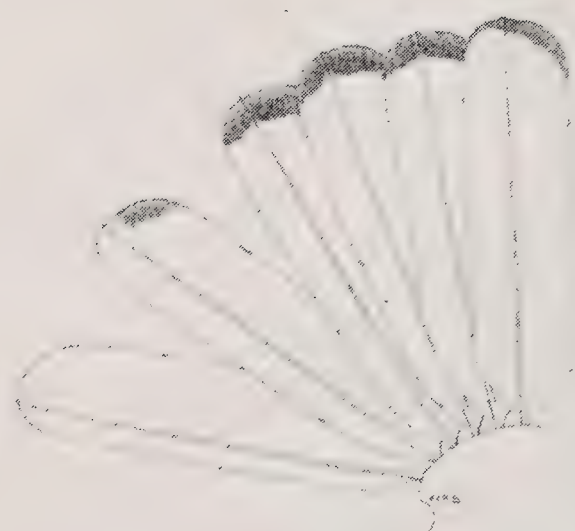
FIG. 350

Hydrocolæus minutus



1st YEAR*

FIG. 351



1st YEAR

FIG. 352



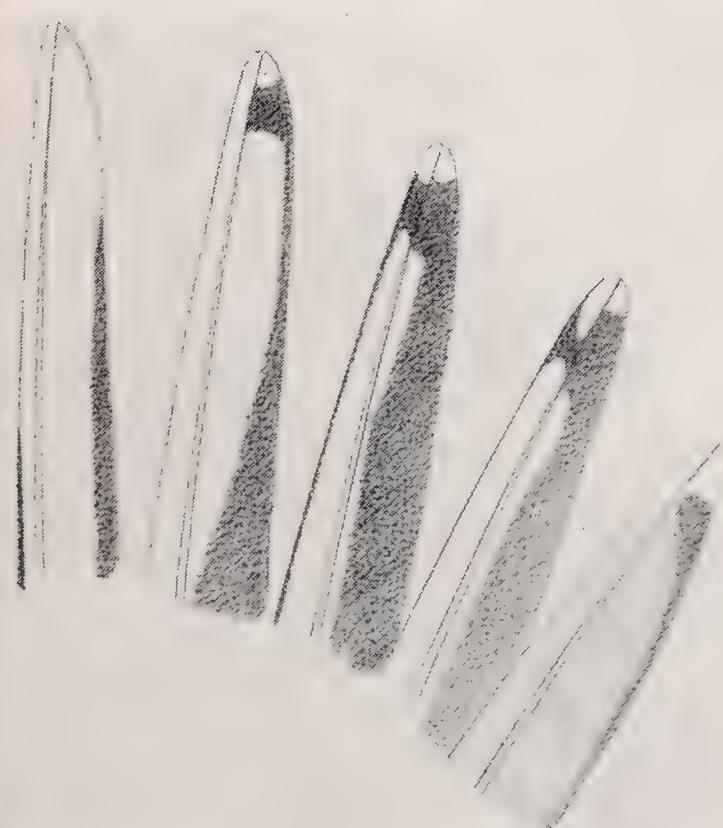
ADULT

FIG. 353



ADULT

FIG. 354



ADULT

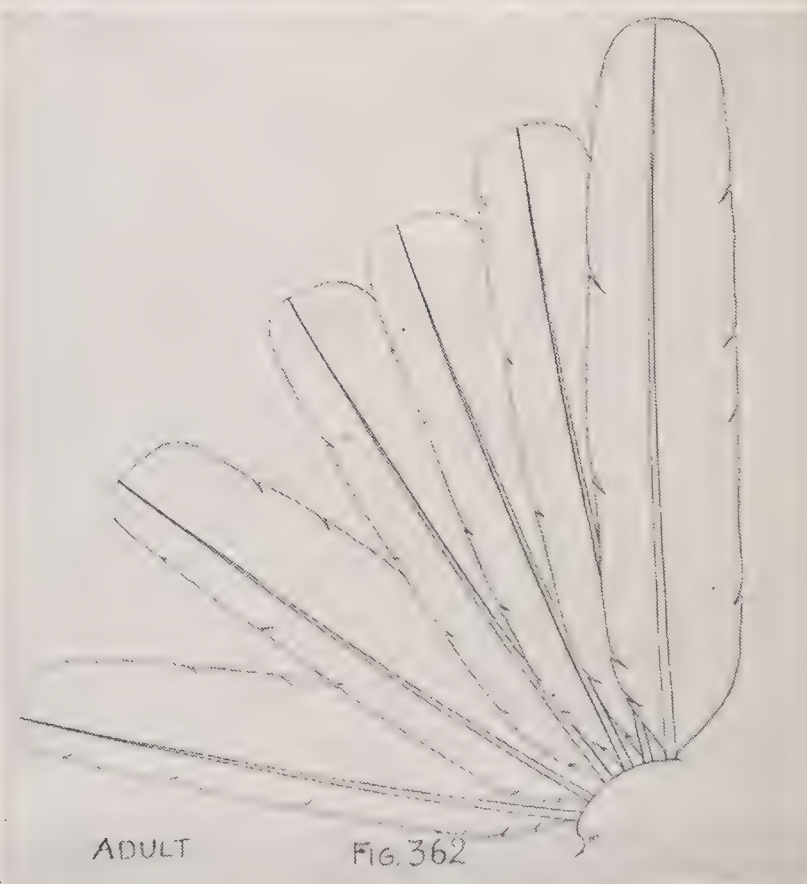
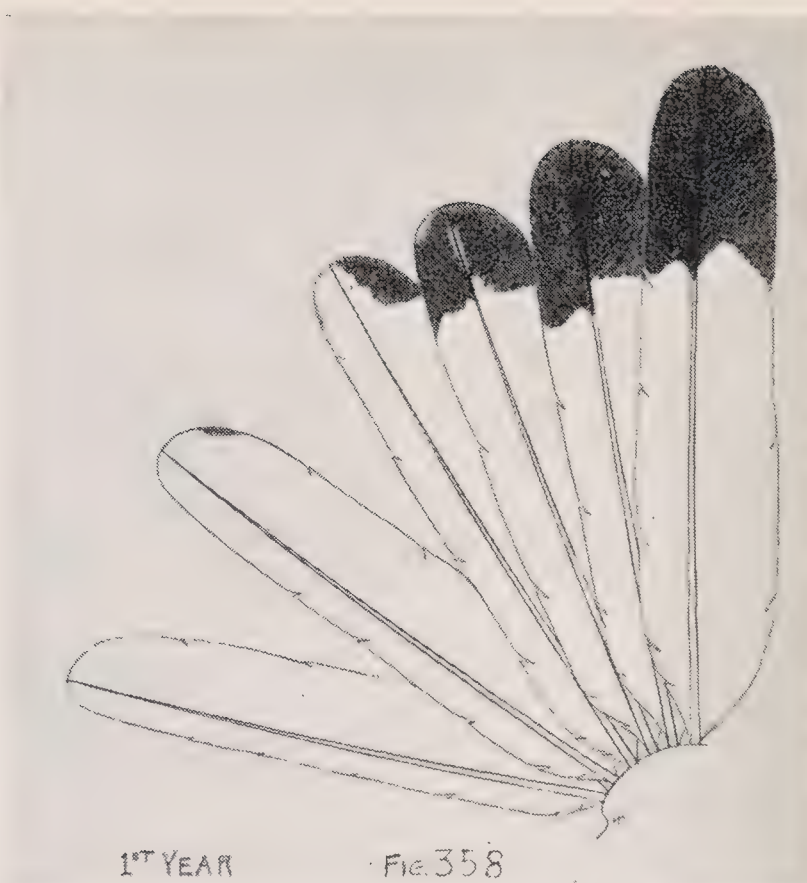
FIG. 355



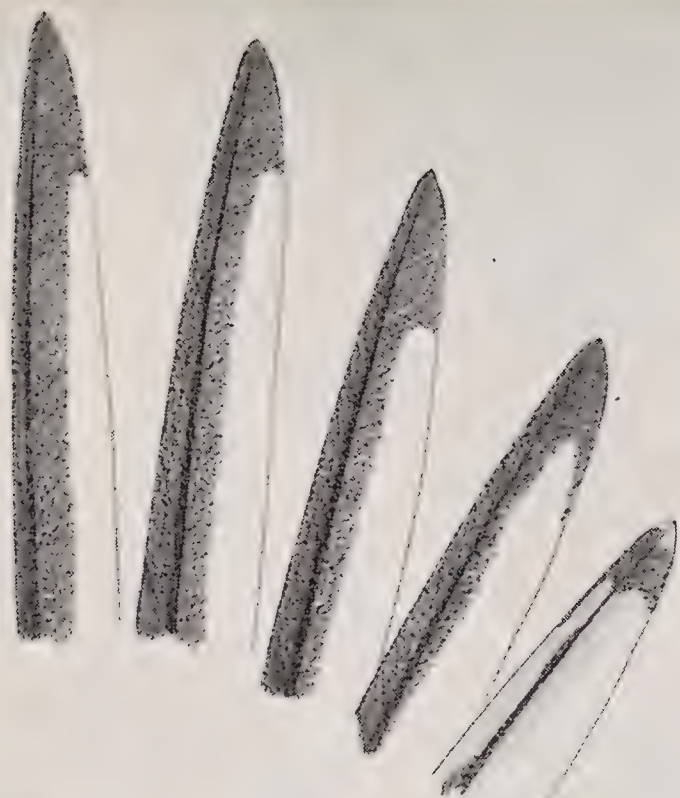
ADULT

FIG. 356

Hydrocolæus saundersi

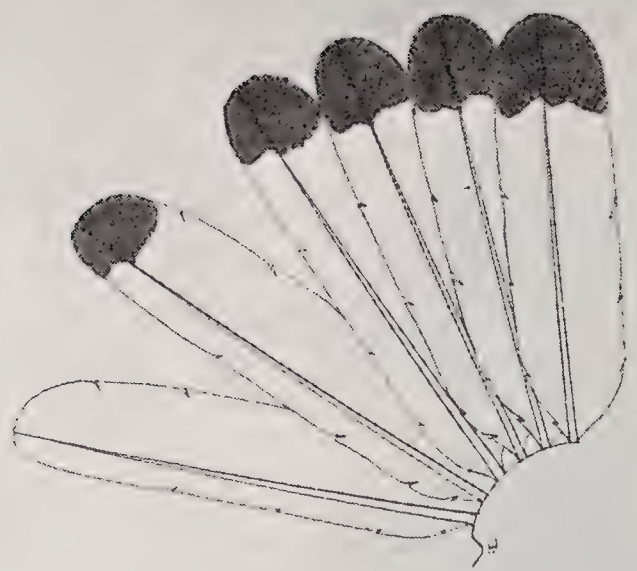


Rhodostethia rosea



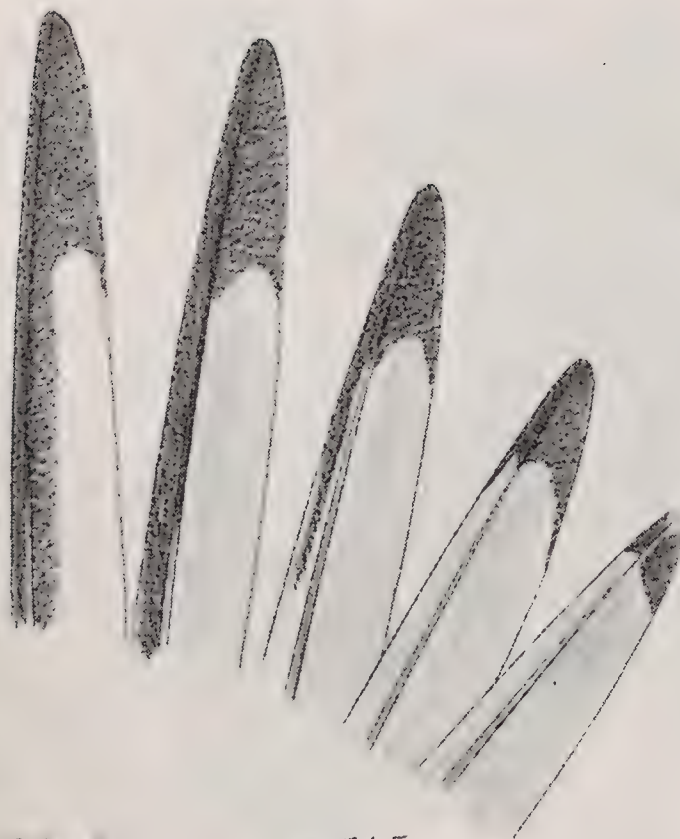
1st YEAR

FIG 363



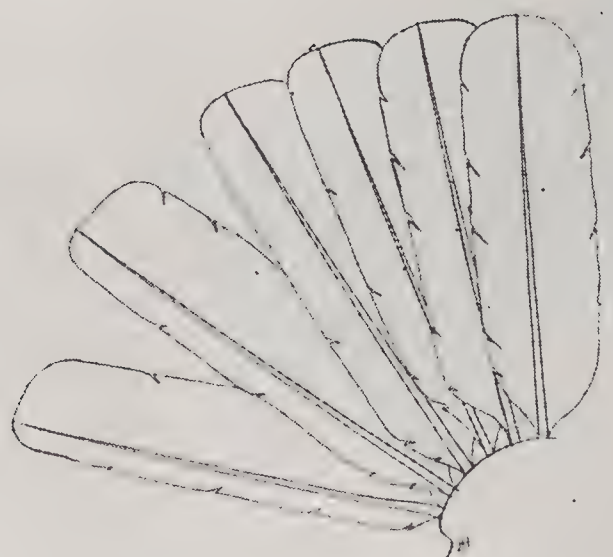
1st YEAR

FIG. 364



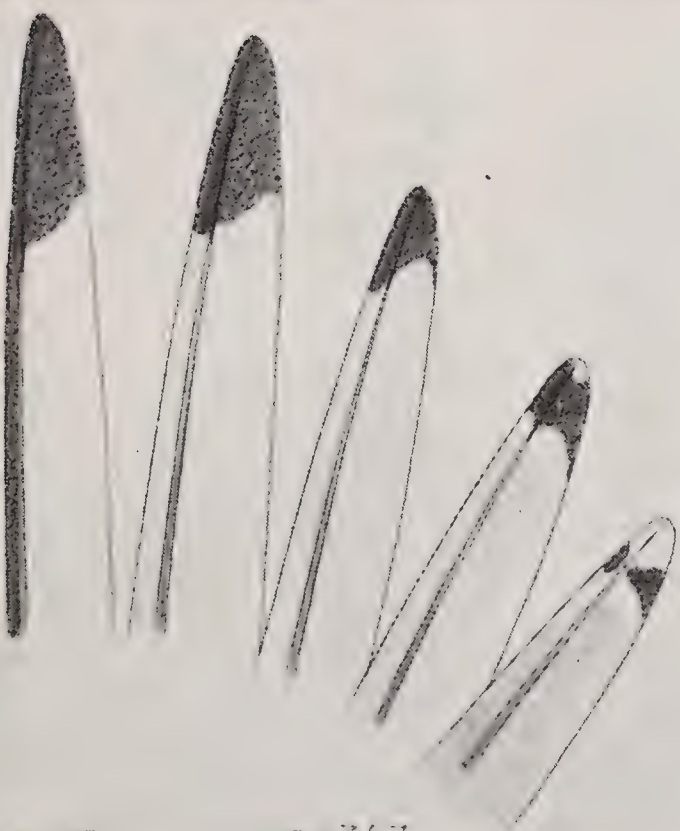
2^o YEAR

FIG. 365



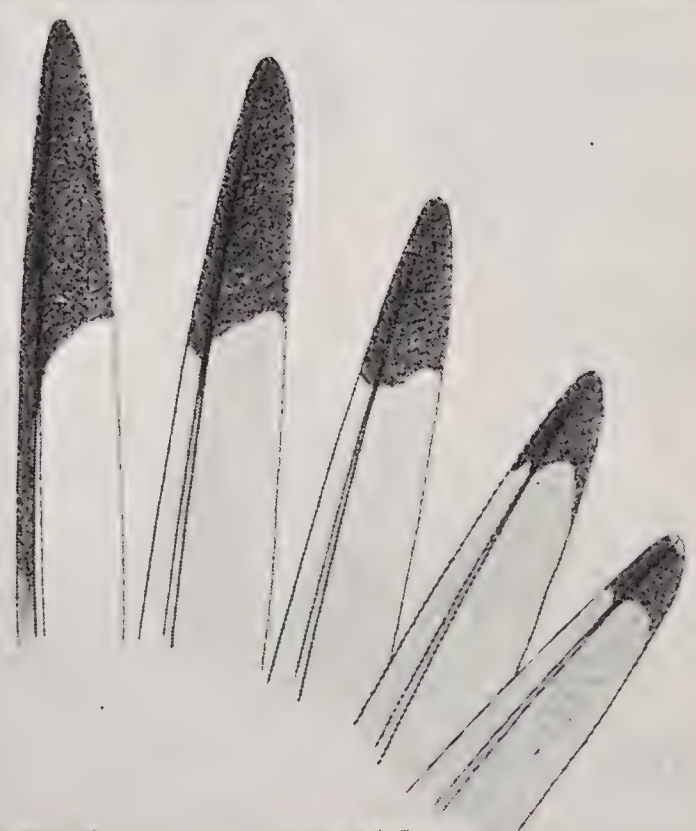
ADULT

FIG. 366



ADULT

FIG 367



ADULT

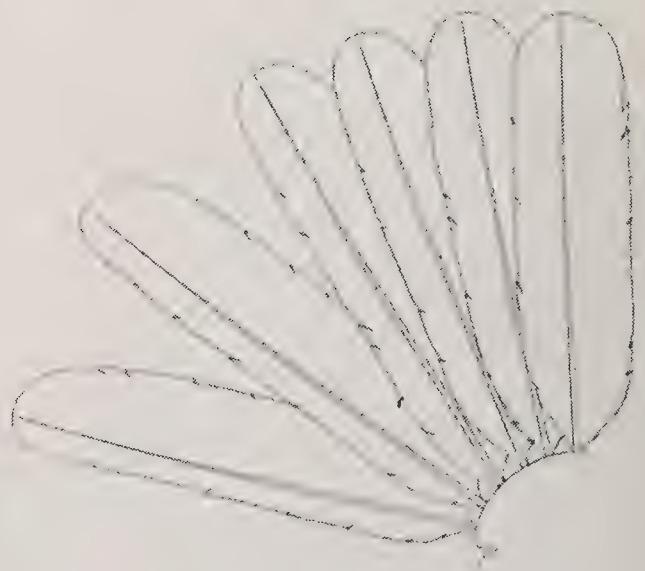
FIG. 368

Rissa tridactyla tridactyla (Figs. 363 to 367)
Rissa tridactyla pollicaris (Fig. 368)

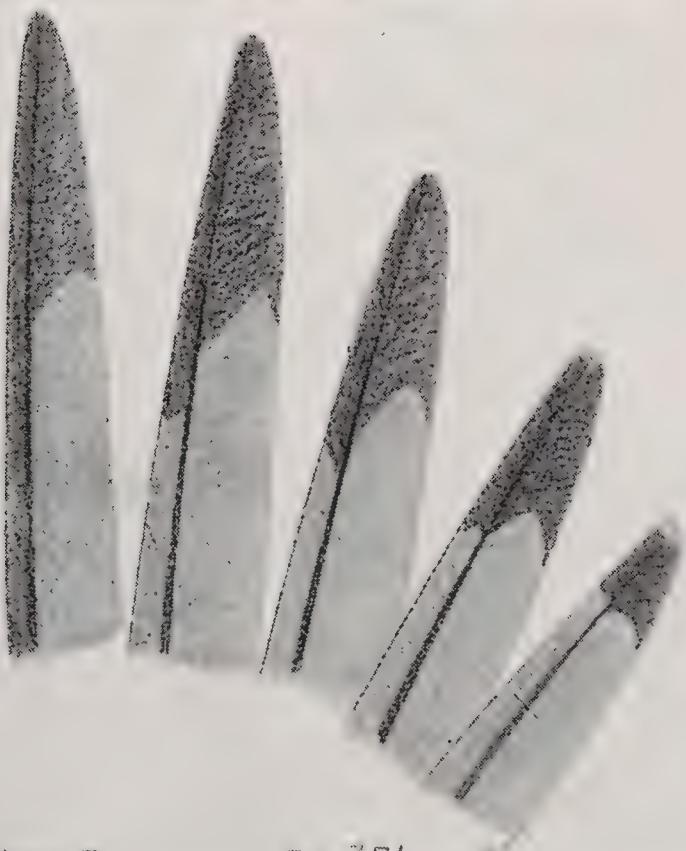


1ST YEAR

FIG 369



1ST YEAR & ADULT FIG 370



ADULT

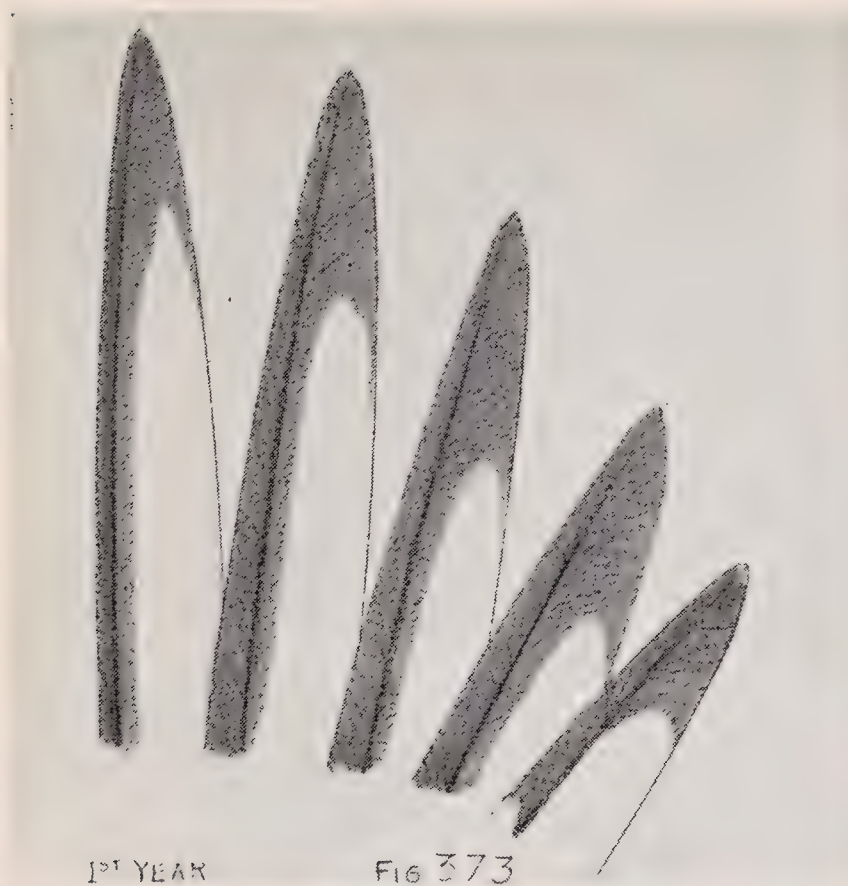
FIG 371



ADULT

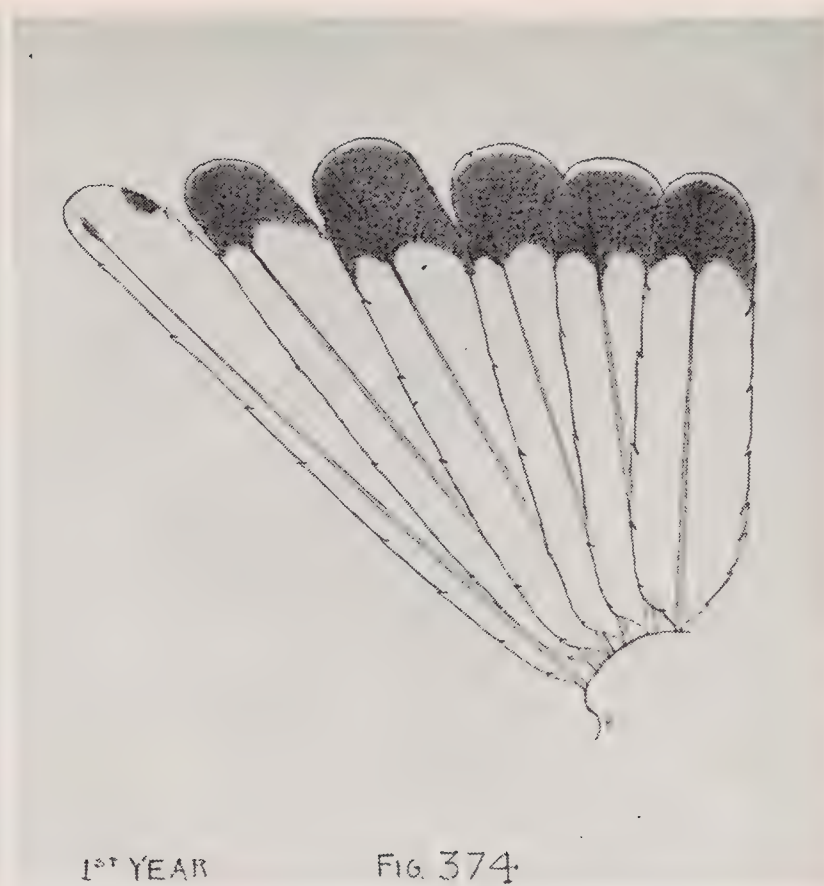
FIG 372

Rissa brevirostris



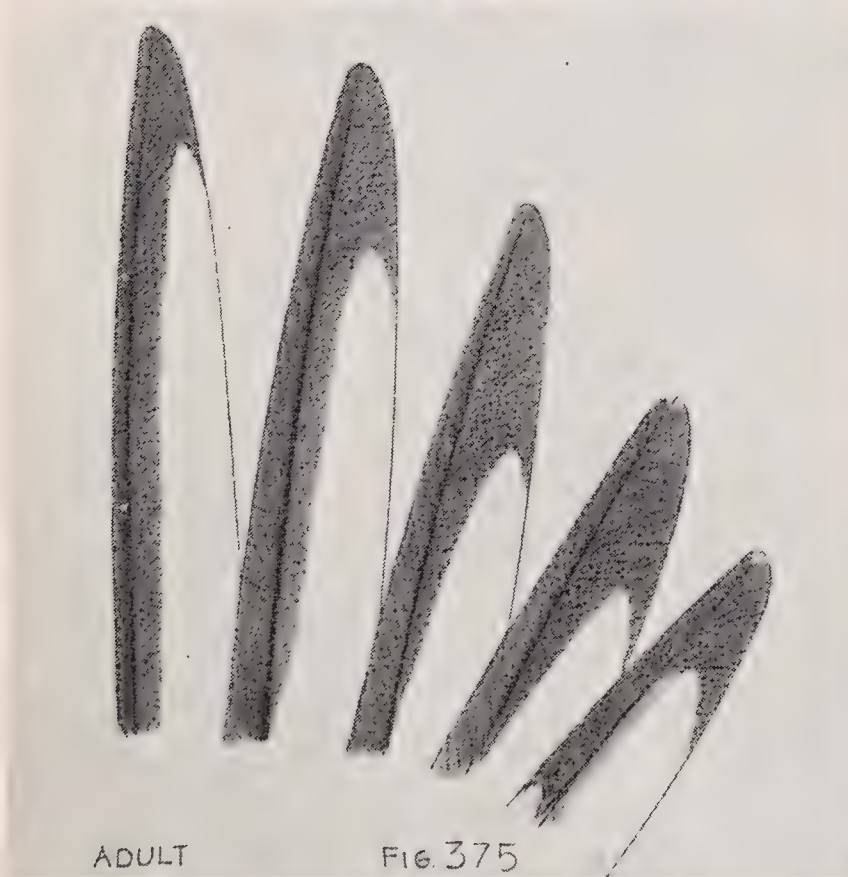
1st YEAR

FIG. 373



1st YEAR

FIG. 374



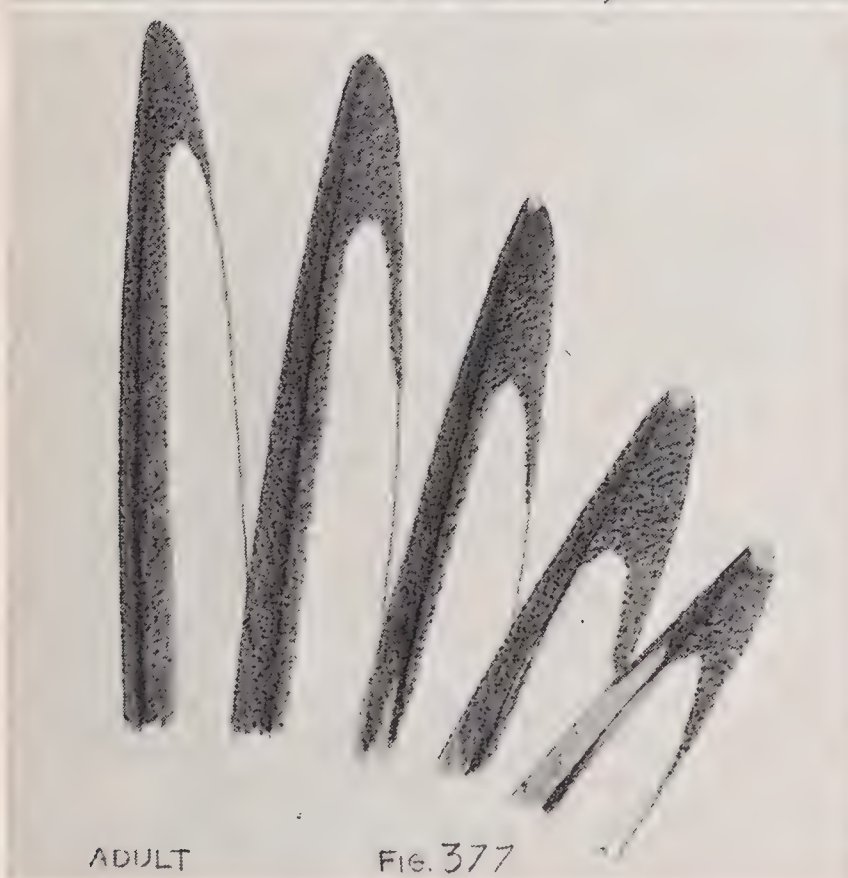
ADULT

FIG. 375



ADULT

FIG. 376



ADULT

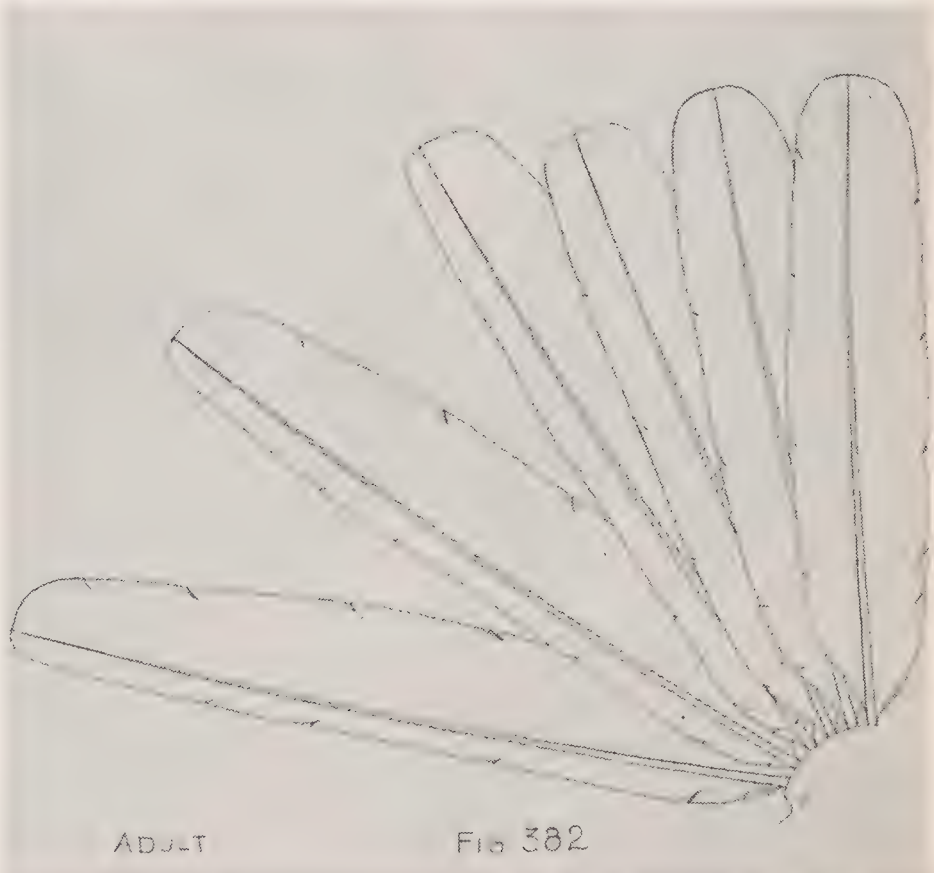
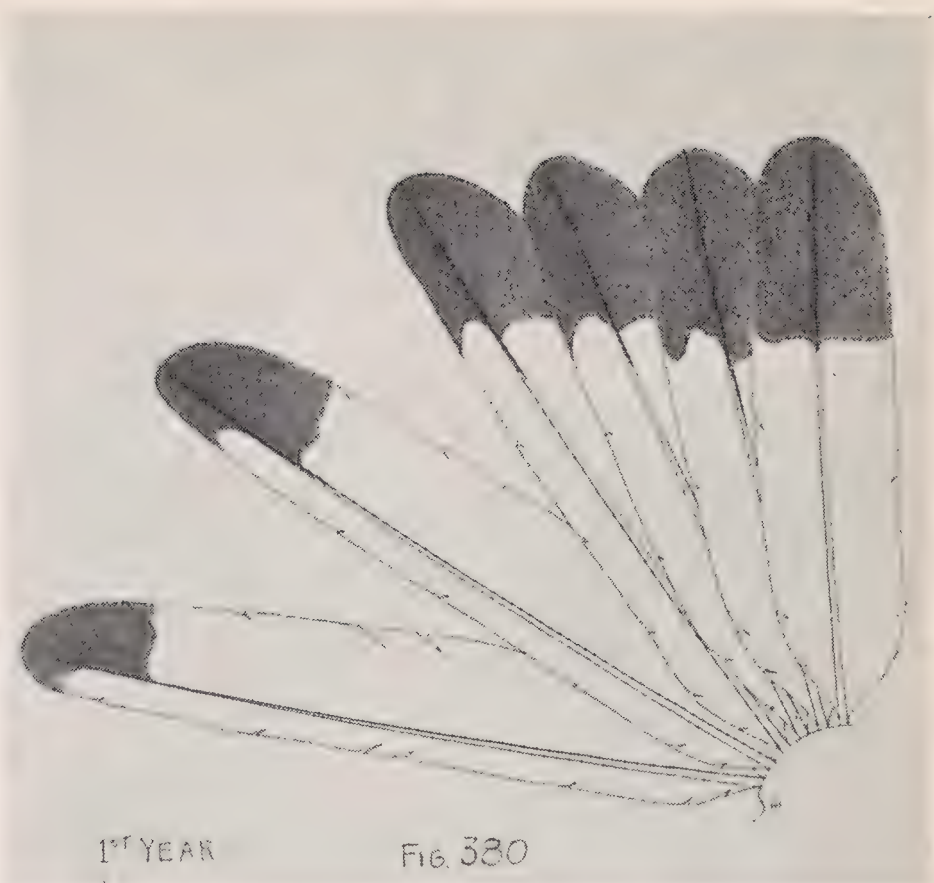
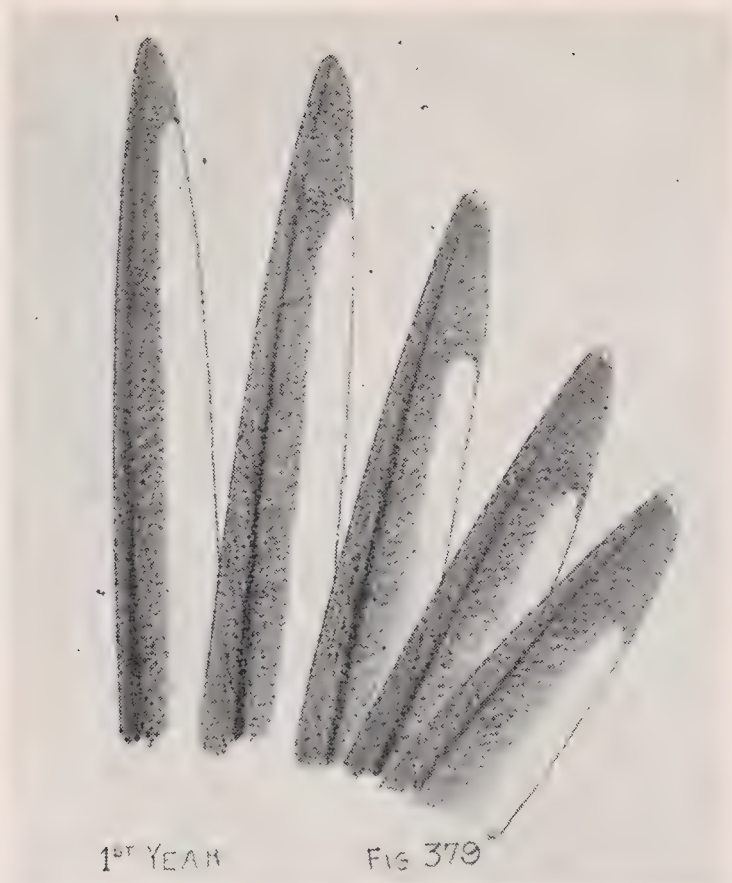
FIG. 377



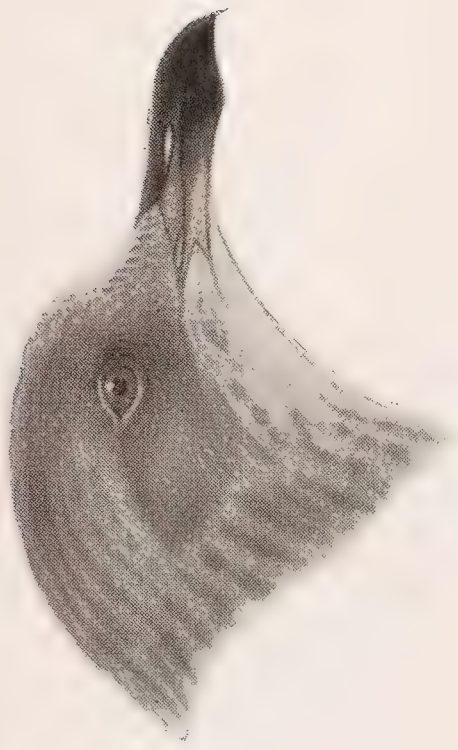
ADULT

FIG. 378

Creagrus furcatus



Xema sabini



1



3



2



4

Fig. 1. *Larus argentatus thayeri*, ♀, juv.

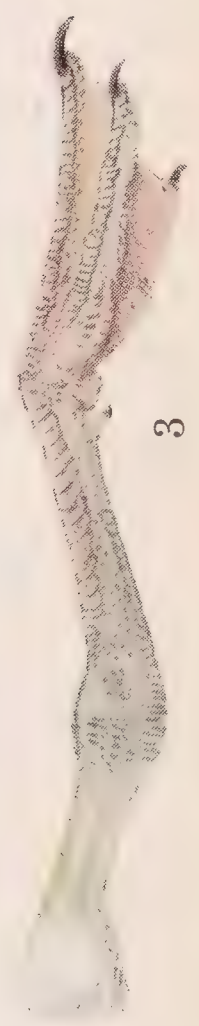
Fig. 2. *Larus argentatus smithsonianus*, ♂, ad. nuptial.

Fig. 3. *Larus californicus*, ♂, juv.

Fig. 4. *Larus californicus*, ♀, ad. nuptial.

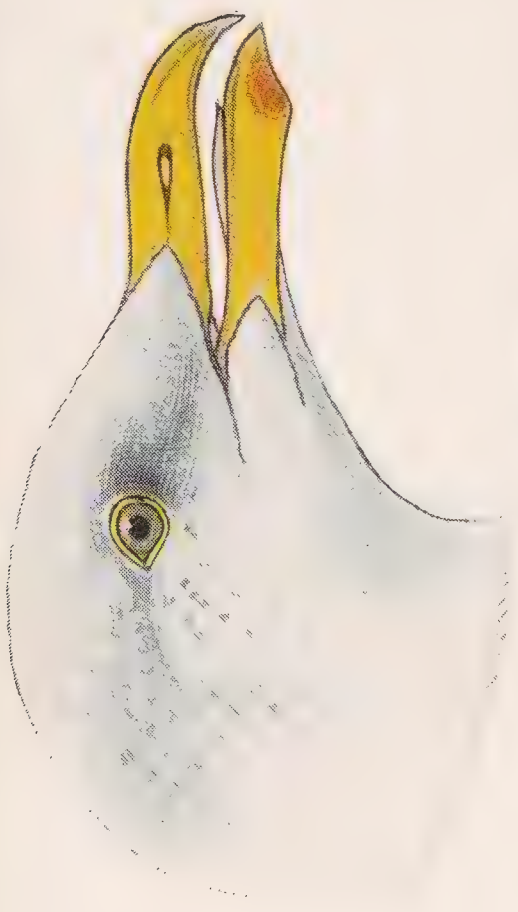


1



3

Fig. 1. *Larus occidentalis occidentalis*, ♀, juv.
Fig. 2. *Larus occidentalis occidentalis*, ♂, ad. winter.



2



4

Fig. 3. *Larus occidentalis occidentalis*, ♂, 3rd winter.
Fig. 4. *Larus argentatus smithsonianus*, ♂, 2nd winter.

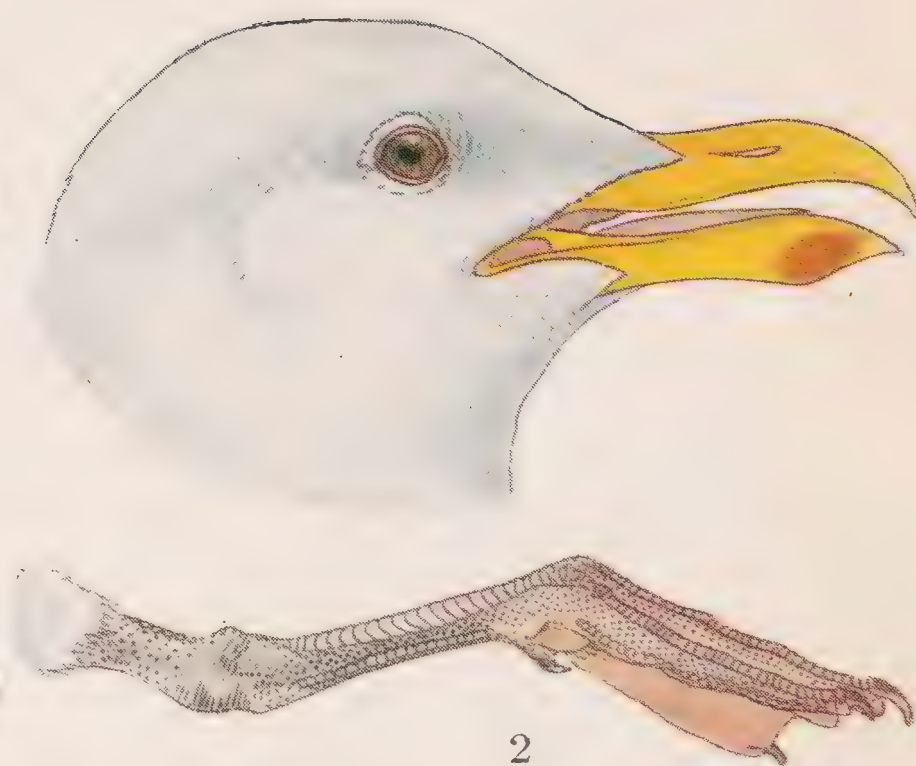
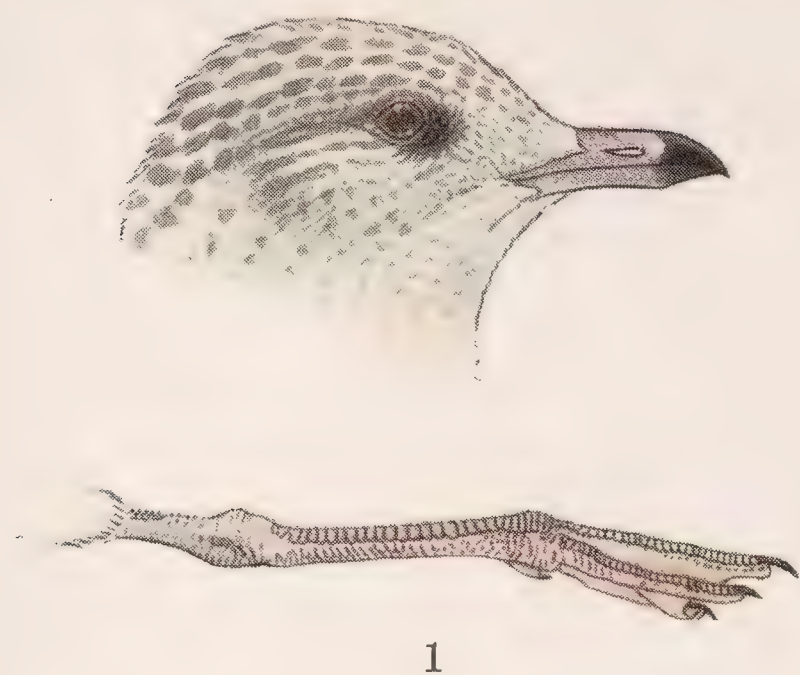


Fig. 1. *Larus glaucescens*, ♀, juv.
 Fig. 2. *Larus glaucescens*, ♂, ad. nuptial.
 Fig. 3. *Larus heermanni*, juv.

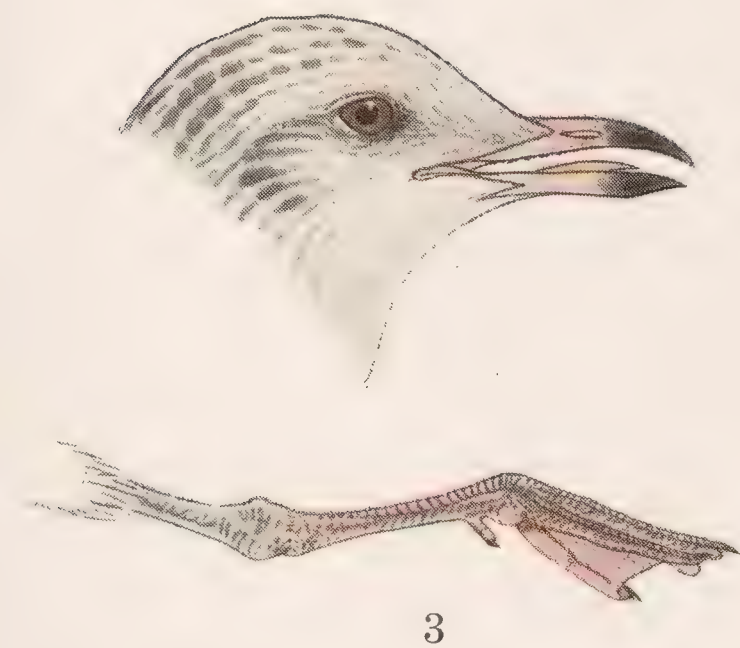
Fig. 4. *Larus heermanni*, ♀, 2nd winter.
 Fig. 5. *Larus heermanni*, ♂, ad. winter.
 Fig. 6. *Larus heermanni*, ♂, ad. nuptial.



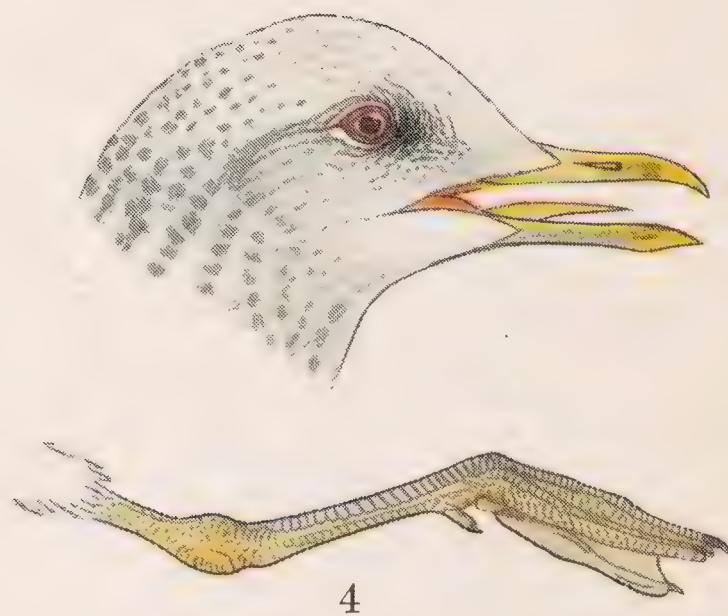
1



2



3



4



5



6

Fig. 1. *Larus delawarensis*, ♀, juv.

Fig. 2. *Larus delawarensis*, ♀, ad. winter.

Fig. 3. *Larus canus brachyrhynchus*, juv.

Fig. 4. *Larus canus brachyrhynchus*, ♂, ad. winter.

Fig. 5. *Xema sabini*, ♀, juv.

Fig. 6. *Rissa tridactyla tridactyla*, ♀, ad. winter.

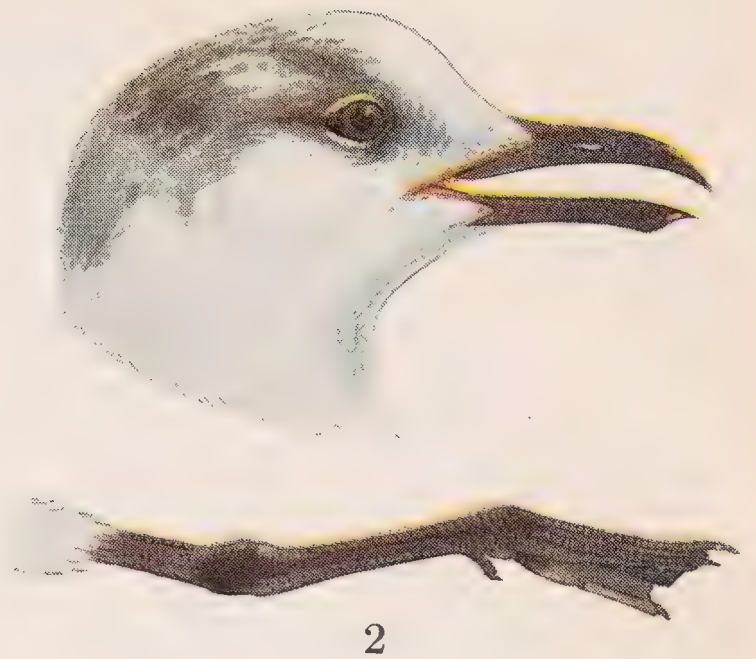
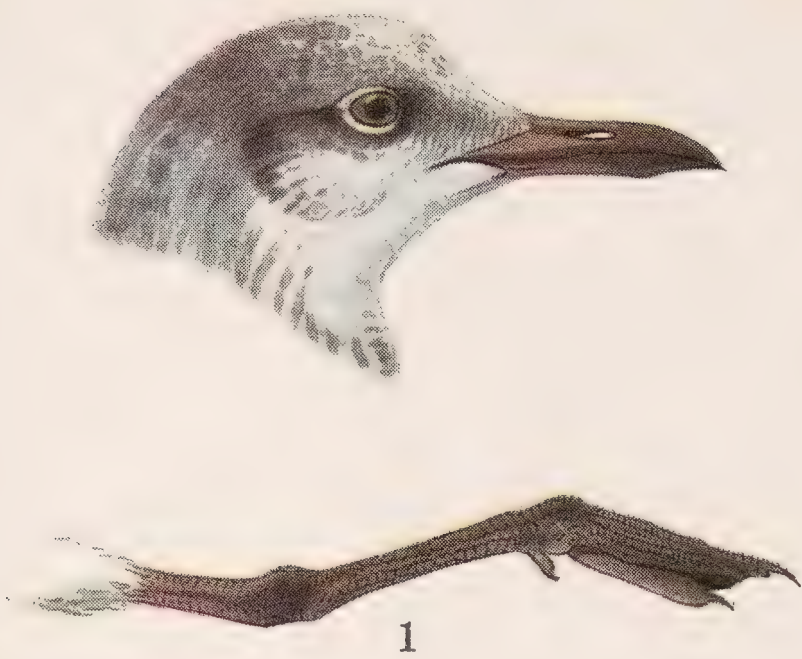


Fig. 1. *Hydrocolæus atricilla*, ♂, juv.
 Fig. 2. *Hydrocolæus atricilla*, ♂, ad. winter.
 Fig. 3. *Hydrocolæus pipixcan*, ♀, juv.

Fig. 4. *Hydrocolæus pipixcan*, ♂, ad. winter.
 Fig. 5. *Hydrocolæus philadelphia*, juv.
 Fig. 6. *Hydrocolæus philadelphia*, ♂, ad. nuptial.

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